This user manual describes all proceedings concerning the operations of this CNC system in detail as much as possible. However, it is impractical to give particular descriptions for all unnecessary or unallowable system operations due to the manual text limit, product specific applications and other causes. Therefore, the proceedings not indicated herein should be considered impractical or unallowable.

This user manual is the property of GSK CNC Equipment Co., Ltd. All rights are reserved. It is against the law for any organization or individual to publish or reprint this manual without the express written permission of GSK and the latter reserves the right to ascertain their legal liability.

PREFACE

Your Excellency,

It's our pleasure for your patronage and purchase of this **GSK6000 Full-Electric Injection Molding Machine Digit Control System** made by GSK CNC Equipment Co., Ltd.

The GSK6000 Full-electric Injection Molding Machine Digit Control System researched and manufactured by GSK Company adopts multi-core frameworks platform with high-side 32-bit industrial-grade ARM, DSP and FPGA. It is combined the advance control technique and carried out the high-speed and accuracy control, so the control system owns the strong function and capacity ensuring that the integral machine can be stably and reliably operated.

Security Warning & Precaution

The accident hazard may occur due to the misoperation. Carefully read this manual and the related description before using this system.

The main controllable objection of the **GSK6000** Full-Electric Injection Molding Machine Digit Control System: high-speed motor, high-temperature heating equipment and other assistance movement mechanism. It may hurt the user by the moving equipment and scald the operator by the cartridge heater and high-temperature plastic, as well the electric shock hazard and other unexpected behavior if the incorrect operations are performed.

To guard against the above-mentioned hazards, the operator, administrator and maintainer should entirely comprehend the User Manual and its related descriptions, and strictly observe the corresponding specifications of this system and equipment safe operations.

We are afraid of that our company will not undertake any obligation if the incorrect operation and maintenance are performed without observing the User Manual, as well freely modify or change the control system causing the accident and damage without any authorization or permission.

It is better to put this manual aside the machine, so that the operator can refer it when some troubles are generated.

※ The manual offers the relative contents and some precautions of the GSK6000 series injection molding machine.

※ This version manual is suitable for the injection machine, which is assembled with GSK6000 Full-Electric Injection Molding Machine Digit Control System.

※ GSK will reserve the rights for changing the appearance, technical specification and parameter based upon the improvement of the product, without prior notice.

Chinese version of all technical documents in Chinese and English languages is regarded as final.

It is necessary to note the following items before using the system:

- **Ensure the ESP button is enabled. Because the ESP input of this system uses the normally closed contactor; the system ESP alarm may occur and can not normally operate if it does not connect the ESP button or connect it as normally open contractor.**
- **Ensure the effective of the safe protection components related with the system (For example: the limit switch of the mechanism).**

Special Tips: User can not use the system power as other purpose!

Security Responsibility

Security responsibility of the manufacturer

——Manufacturer should take responsibility for the design and structure danger of the digital control systems and the accessories which have been eliminated and/or controlled.

——Manufacturer should take responsibility for the security of the digital control systems and accessories.

——Manufacturer should take responsibility for the offered information and suggestions for the user.

Security responsibility of the users

——User should know and understand about the contents of security operations by learning and training the security operations of the digital control system.

——User should take responsibility for the security and danger because of increasing, changing or modifying the original digital control system or accessory by themselves.

——User should take responsibility for the danger without following the corresponding operations, regulation, maintenances, installations and storages digital control system described in the manual.

This manual is reserved by final user.

Sincere thanks for your supporting of GSK's products!

LIST

CHAPTER ONE PURPOSE 1
1.1 Reading Object 1
1.2 How to Use this Manual 1
1.3 Related Document 1
1.4 Appointment 1
CHAPTER TWO BRIEF 5
2.1 Main Character of GSK6000 Digit Control System 5
2.2 GSK6000 Control System Configuration 6
2.3 Man-Machine Interface Compsition & Miscellaneous Operation Panel Button Function Brief 6
CHAPTER THREE SAFETY APPLICATION 13
3.1 Safety Application 13
3.1.1 Definition of User 13
3.2 Safety Application Precaution 14
3.2.1 Precaution of System Installation 14
3.2.2 Precaution for Guard Against an Electric Shock Hazard 14
3.3 Main Proceeding for Circuit 16
3.3.1 Controllable Circuit 16
3.3.2 Precaution of PCB 16
3.3.3 Environment Setting 17
3.4 Requirement Proceeding of Auxiliary Equipment Installation 17
3.4.1 Grounding for Subsidiary Equipment 17
3.4.2 Grounding for Clutter Machine Generation 18
3.4.3 Measurement for Static Clutter 18
3.4.4 Shielding of Electromagnetic Equipment 18
3.4.5 Utilization of Internal DC Power 18
3.4.6 Utilization of Thermocouple 19
3.5 Touch Screen Calibration 19
CHAPTER FOUR OPERATION 21
4.1 Operation Brief 21
4.1.1 System Working Mode 21
4.1.1.1 [MANUAL] Mode Explanation 22
4.1.1.2 [SEIM-AUTOMATIC] Mode Explanation 22
4.1.1.3 [FULL-AUTOMATIC] Mode Explanation 23
4.1.1.4 [MOLD-ADJUSTMENT] Mode Explanation 23
4.1.2 Function Configuration Before Injection 24
4.1.2.1 Motor Start & Stop 24
4.1.2.2 Mold-Clamping & Mold-Opening 25

4.1.2.3 Ejector Operation....25
4.1.2.4 Operation of Ejection Equipment....26
4.1.2.5 Mold Installation....26
4.1.2.6 Screw Operation....26
4.1.2.7 Temperature Control....27
4.1.3 Injection Function Plan....28
4.1.3.1 Automatic Electric Heating Start....28
4.1.3.2 Automatic Electric Heating Setting Method Start....29
4.1.4 Injection Condition Setting....30
4.1.4.1 Read Parameter....30
4.1.4.2 Mold Opening/Clamping Parameter....30
4.1.4.2.1 [Clamp] page....30
4.1.4.2.2 The [Detail] Page....32
4.1.4.3 Injection Metering Parameter....32
4.1.4.3.1 [Metering] Page....32
4.1.4.3.2 [Mete.Detai] Page....34
4.1.4.4 [Ejection] page....35
4.1.4.5 Temperature Parameter....35
4.1.4.5.1 [Heater] page....35
4.1.5 Confirm Before the Batch Production....37
4.1.5.1 Material-cleaning....37
4.1.5.2 [Product] page....37
4.1.5.3 [Quality] Page....38
4.1.5.4 [Trend] Page....39
4.1.5.5 [Statistics] Page....40
4.2 Miscellaneous Panel Button Operation....41
4.2.1 Preparation/Confirmation Before Operation....41
4.2.1.1 Reset Operation of ESP Button....41
4.2.1.2 Operation of Main Power ON....41
4.2.1.3 System Language Selection....44
4.2.1.4 Motor's Power ON....44
4.2.1.5 The Power ON of the Electric Heater....44
4.2.2 Operations of Operation Modes....46
4.2.2.1 General-purpose Operation of Modes....46
4.2.2.2 Manual Operation Mode....49
4.2.2.2.1 Button Operation Explanations both Operation Mode Shift ([Manual] mode) & Auxiliary Operation Panel....49
4.2.2.2.2 [MANUAL] Mode Operation Precaution....56
4.2.2.3 [SEMI-AUTOMATIC] Mode Operation....56
4.2.2.3.1 Usable Button of Operation Mode Shift ([SEMI-AUTOMATIC] Mode) and

Auxiliary Operation Panel 56
4.2.2.3.2 Operation Schedule of [SEMI-AUTOMATIC] Mode 57
4.2.2.3.3 Semi-Automatic Subsidary Function 59
4.2.2.4 [Full-AUTOMATIC] Mode Operation 60
4.2.2.4.1 Button for Operation Mode Shift ([FULL-AUTOMATIC] Mode) and Auxiliary Operation Panel 60
4.2.2.4.2 [Full-automatic] Mode Operation Schematic 62
4.2.2.5 Mold-Adjustment Operation 64
4.2.3 Button Operation of Automatic Material-cleaning 66
4.2.4 Confirmation/Stop Operation of Injection Molding Machine End 67
4.2.4.1 Stop of Full-automatic Operation 67
4.2.4.2 Save of Molding Condition 67
4.2.4.2.1 Machine Save 67
4.2.4.2.2 U-disk Save 68
4.2.4.3 Electric Heat Power Cut-off 69
4.2.4.4 Mold Detection 69
4.2.4.5 Cut off the Motor's Power 70
4.3 Parameter/Function Setting 71
4.3.1 Mold Opening/Clamping 71
4.3.1.1 Page of [Clamp] 71
4.3.1.1.1 Mold Installation 71
4.3.1.1.2 Mold-Opening 72
4.3.1.1.3 [MoldClose] 73
4.3.1.1.4 Mold Protection 76
4.3.1.1.5 Mold Protection Setting 76
4.3.1.1.5.1 Mold Protection Setting 1 77
4.3.1.1.5.1.1 Intelligent Monitoring ([AIMonitor]) 77
4.3.1.1.5.1.2 [CustomMonitor] 78
4.3.1.1.5.2 Mold Protection Setting 2 78
4.3.1.1.5.3 Mold Protection Setting 3 79
4.3.1.1.6 Relative Mold 80
4.3.1.1.7 [Clamp] Page Monitoring Data 80
4.3.1.2 Detail of Mold Opening/Clamping 81
4.3.1.2.1 Blowing Setting 81
4.3.1.2.2 CoreA-Pulling Setting (Selective Purchasing Function) 82
4.3.1.2.3 User Definition 87
4.3.1.2.4 PLC Wiring Table 89
4.3.1.2.5 Monitoring Data of [Detail] Page 89
4.3.1.3 Ejection 90
4.3.1.3.1 Ejector Relative Setting 90

4.3.1.3.1.1 Ejector Forward Parameter Setting 90
4.3.1.3.1.2 Ejector Retreat Parameter Setting 91
4.3.1.3.1.3 [PauseMode] Setting 91
4.3.1.3.2 Other Functions 92
4.3.1.3.3 Monitoring Data of [Ejection] Page 93
4.3.2 Temperature 94
4.3.2.1 Automatic Start 94
4.3.2.1.1 Data Display and Setting 94
4.3.2.1.1.1 Modification Method: 94
4.3.2.1.2 Timing Start Setting 95
4.3.2.1.2.1 Monitoring Data of [AutoStart] Page 96
4.3.2.2 Heating Part 96
4.3.2.2.1 Setting Principle of General Temperature 96
4.3.2.2.2 [Heater] Page 97
4.3.2.2.2.1 Start of Cold Start Prevention 97
4.3.2.2.2.2 [ScrewLockTm.] 98
4.3.2.2.2.3 Cold Start Prevention 98
4.3.2.2.2.4 Cartridge Heater Page Monitoring Data 99
4.3.3 Injection and Metering 99
4.3.3.1 Injection Metering 100
4.3.3.1.1 Injection Speed Setting 100
4.3.3.1.1.1 Delay Setting Before Injection 101
4.3.3.1.2 [V-PSwitch] Setting 101
4.3.3.1.3 Injection Pressure ([Inj.Pre.]) Setting 102
4.3.3.1.4 Packing Setting 103
4.3.3.1.5 Metering 104
4.3.3.1.5.1 Metering Procedure 104
4.3.3.1.6 Metering Forward Screw Back 105
4.3.3.1.7 Delay Before Metering 105
4.3.3.1.8 Metering Backward Screw Back 105
4.3.3.1.9 Other Related Setting (Time-consuming, Data Express) 106
4.3.3.1.10 Monitoring Data on [Metering] Page 106
4.3.3.2 Injection Metering Details ([Mete.Detail]) 107
4.3.3.2.1 Setting of Motion Sensitivity ([OperationSensitivitySet]) 107
4.3.3.2.2 Nozzle Retreat After Molding ([NozzleBackAf.Mold]) 108
4.3.3.2.3 Material-Cleaning ([PurgeTemp.]) 108
4.3.3.2.4 Monitoring Data on [Mete.Detail] Page 110
4.4 Production Management 111
4.4.1 Project Monitoring 111
4.4.1.1 [Monitor] 111

4.4.1.2 Flow Display 111
4.4.1.3 Real-Time Monitoring 112
4.4.1.4 Data Recording 112
4.4.1.5 Animation Demonstration 113
4.4.2 Product Management 113
4.4.2.1 Operation Procedure 114
4.4.2.2 Other Operations 115
4.4.3 Quality Management 116
4.4.3.1 Quality Judgement 116
4.4.3.2 Abnormal Judgment 117
4.4.3.3 Comprehensive Operation 117
4.4.4 Statistics 121
4.4.4.1 Production Record Display 121
4.4.4.1.1 Product State Display 122
4.4.4.1.2 Production Record & Statistic Value Zeroing 122
4.4.4.2 Display of Inferior Record 123
4.4.4.2.1 Product State Display 123
4.4.4.2.2 Statistics to zero 124
4.4.5 Tendency Chart 124
4.4.5.1 Selection of Data Type 125
4.4.5.2 Tendency Chart Resetting 126
4.4.5.3 [CenterValue] Setting of Tendency Chart 127
4.4.5.4 [Range] Setting of Tendency Chart 127
4.4.6 Historical Records 129
4.4.7 Parameter Exchange 129
4.4.7.1 Local saving 129
4.4.7.2 U-Disk Save 133
4.5 Input/Output State Monitoring 137
4.5.1 I/O Diagnosis 137
4.5.2 Motor Diagonsis 139
4.5.2.1 Graph Display 139
4.5.2.2 Motor I/O Display 140
4.5.2.3 Motor’s Current State 140
4.5.2.4 Motor Selection 141
4.5.1 Logging-in Setting 141
4.5.4 System Setting 146
4.5.5 Thermostat Parameter 148
4.5.6 Page Customization 150
4.5.6.1 Page Shifting Customization 150
4.5.6.2 Page Feedback Customization 154

4.6 Reason and Troubleshooting for Defective Product During Injection Molding 157
4.7 Calculation Method of Mold-Clamping Force 173

CHAPTER ONE PURPOSE

"GSK6000 Full-Electric Injection Molding Machine Digit Control System User Manual" is compiled for the man who will operate or use the GSK6000 Full-Electric Injection Machine Digit Control System.

This manual is detailed in the button operation, main parameter setting and each function usage, so that the user can entirely comprehend this digital control system, whose can set the related parameter, and correctly use and operate the qualified product produced by this system.

1.1 Reading Object

This manual is suitable for the operator; maintainer and related administrator who are use this system.

1.2 How to Use this Manual

This manual is detailed the usage and related setting of the digital control system, it is better to fully read this User Manual. Combine the man-robot interface of the control system, gradually understand and grasp the operation methods and techniques of this digital control system based upon the basis working schedule of the injection molding machine. Integrate the theory with practice and manual practice, so that you can rapidly grasp each function and usage of the GSK6000 Full-electric Injection Molding Machine Digital Control system.

1.3 Related Document

Refer to this User Manual for the Injection Machine Digital Control System.

Refer to the operation and maintenance of the mechanical explanations for the injection molding machine mechanism.

1.4 Appointment

(1) The "GSK" described in this manual is the abbreviated of the GSK CNC EQUIPMENT CO., LD.

(2) If there is no special explanation, the "System" in this manual means "GSK6000 Full-electric injection molding machine digital control system" of the GSK CNC Equipment Company.

(3) The mold-clamping, mold-closing appointment: The mold-clamping is an essential operation at the end period during the mold-closing. The mold-clamping and mold-closing will regarded as a same operation if there is no special explanation in this manual.

The Metric system unit is use only in this manual, wherein, the unit and dimension used in this manual are shown below:

1) mm: Millimeter

2) cm: Centimeter

3) m: Meter

4) cm^3: Cubic centimeter

5) g: Gram

6) kg: Kilogram

7) t: Ton (clamping close unit)

8) N: Newton

9) kN: Kilonewton (The unit of the clamping force)

10) kw: Kilowatt (The unit of the power)

11) Pa: Pascal (The unit of the pressure)

12) MPa: Megapascal (The unit of the pressure)

13) $kg.f/cm^2$: kilogram force/square centimeter (pressure unit)

14) ^oC: Celsius degree

15) ℉: Fahrenheit

16) Sec (S): Second

17) h: Hour

18) min: Minute

19) r/min: Rev./min. (The unit of the rotation speed)

(4) The relative figure symbol in this manual

[DANGER] It is reminded the user to hold the uppermost warning. You must strictly abide by the operation specifications and methods in the User Manual, otherwise, the death hazard may occur.

[WARNING] It is reminded the user to hold the uppermost warning. You must strictly abide by the operation specification and methods in the User Manual; otherwise, it may result in severe injury or death.

[NOTICE] It is reminded the user to hold the uppermost warning. You must strictly abide by the operation specification and methods in the User Manual; otherwise, it may cause injury or danger.

[INSTRUCTION] It is reminded the user to hold the uppermost warning. You must strictly abide by the operation specification and methods in the User Manual; otherwise, the device may be damaged or destroyed.

[REMINDING] It means that it is very important; readers should read its content carefully.

CHAPTER TWO BRIEF

2.1 Main Character of GSK6000 Digit Control System

GSK6000 Full-electric Injection Molding Machine Digital Control System is gathered 10 years successful experiences in machine CNC system, AC servo motor and servo drive products for the product research, manufacture and application by the Guangzhou CNC Equipment Company. It is researched and developed by ourselves, which owns the whole proprietary intellectual property rights. And also, it is suitable for the high capacity digital control equipment with the high-speed and high-precision.

This series product is combined the user's habit, and inherited the advantage with high capacity of our digital control system. It uses the advance production technology control method in the injection industry.

This system owns the following characters:

(1) The 32-bit high capacity industry level ARM, DSP multiprocessor and the FPGA design are used; fast calculation speed and high control precision;

(2) It uses the 15 inch hi-lite and high resolution industry LCD;

(3) It uses the touch screen input; it is very convenient to operate;

(4) The common-use buttons are freely set, one-step operation, convenient and utility

(5) Multi-level parameter password and data lock is very convenient to the user to administrate the equipment and the product data;

(6) History operation and malfunction real-time record for analyzing the troubles;

(7) It owns the multiple-circuit USB interfaces, which can be connected with the keyboard, mouse and U-disk.

(8) The GSK-Link high speed industry Ethernet bus is adopted to connect the external mold;

(9) PLC control built-in, it is very convenient to extend the periphery auxiliary equipment for the users;

(10) The weekly temperature timing heat equipment; it is very convenient to product and improves the efficiency;

(11) Temperature control with the study type intelligent PID, faster and more accuracy in temperature control;

(12) The strong self-diagnosis function is very convenient to maintain the equipments;

(13) The input/output adopts the photoelectricity insulation, the antijamming capacity is strong with the short-circuit protecting function of the output;

(14) The automatic molding-adjustment function and material-cleaning function are performed; the operation is convenient and faster;

(15) The mold protecting function can be protected the mold effectively;

(16) It owns the multi-step injection and multi-level protection, which can be improved the product quality;

(17) It owns the molding video monitoring and the connection interface of the robot;

(18) Multiple types core-pulling twist programs, which uses for different controls for it (Option);

(19) The Ethernet interface can be carried out the long-distance manufacture monitor, long-distance malfunction diagnosis and long-distance program promotion (Option);

(20) The multi-machine networking operation, the long-distance administration product and the data table statistic and print can be achieved by the Ethernet (Option);

(21) The common-use interface of the import motor injection molding machine can be customized, which is used the change of the old equipment system (Option);

2.2 GSK6000 Control System Configuration

System host: one set

I/O board: one block

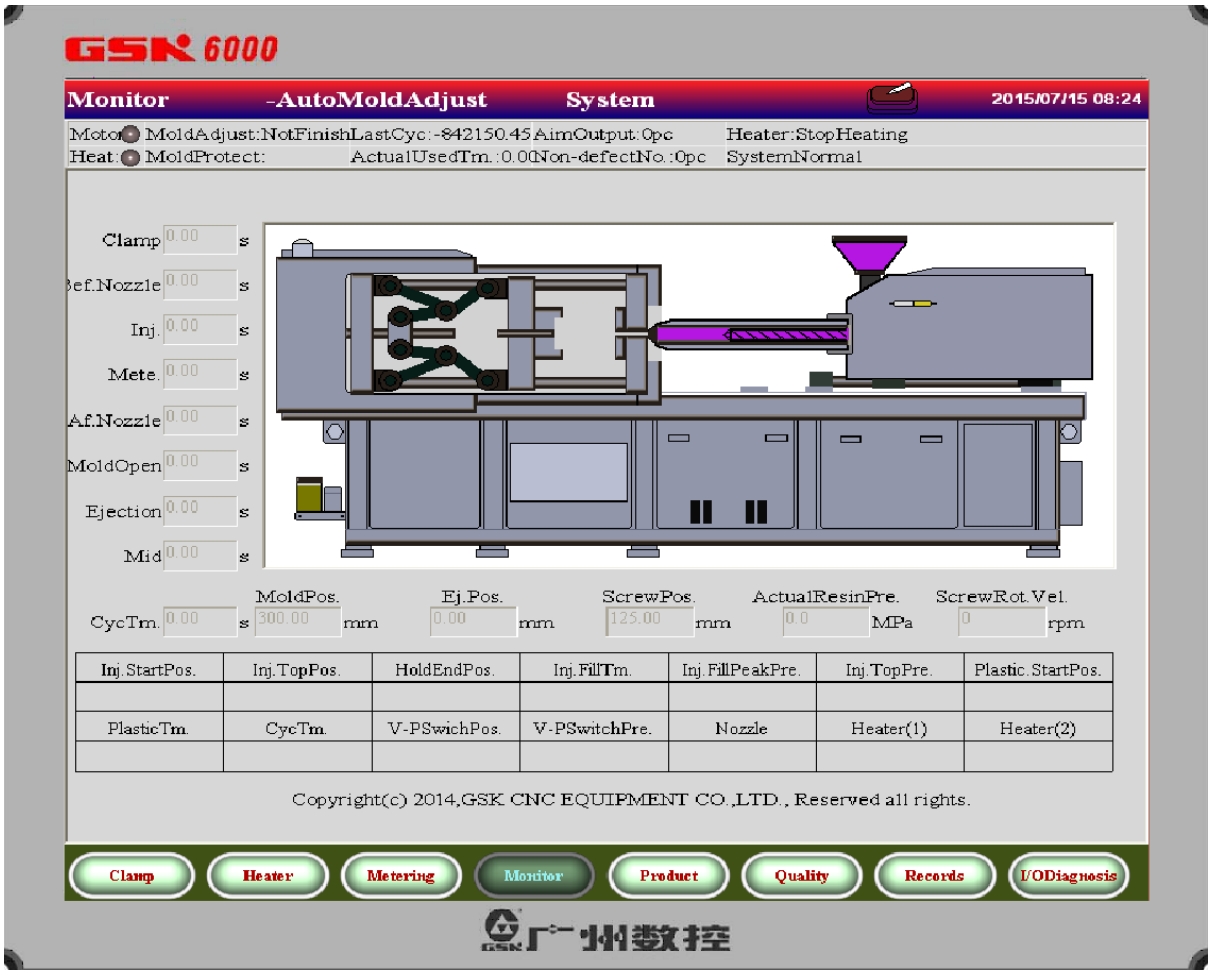
Display board: one set

Operational panel: one set

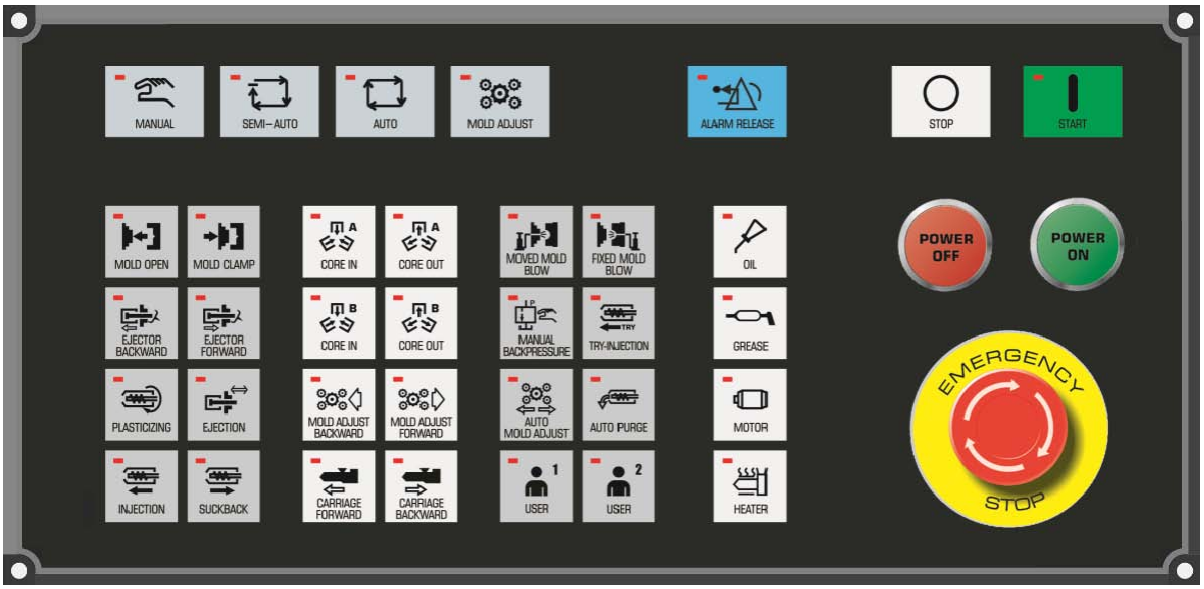
Power: one

2.3 Man-Machine Interface Compsition & Miscellaneous Operation Panel Button Function Brief

(1)Full-Touch LCD display screen

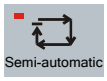


(2) Miscellaneous operation panel



(3) The button function (Refer to the relative contents in the following chapter Operation for the operation methods) of the miscellaneous operation panel is described blow:

[MANUAL] The indicator is Normal-ON after pressing this button, and then the **[MANUAL]** working mode can be entered.



[SEMI-AUTOMATIC] button The indicator is normally on after controlling this button; the **[SEMI-AUTOMATIC]** working mode is then performed.

[FULL-AUTOMATIC] button The indicator is normally on after controlling this button; the **[FULL-AUTOMATIC]** working mode is then performed.

[MOLD-ADJUSTMENT] button The indicator is normally on after controlling this button; the **[MOLD-ADJUSTMENT]** working mode is then performed.

[WARNING REMOVAL] button After cleaning the alarm resource when the system displays the alarm prompt, the alarm prompt displayed on the screen can be removed by this button.

[STOP] button The system may stop the current working procedure during the operation of the **[FULL-AUTOMATIC], [SEMI-AUTOMATIC]** or **[AUTOMATIC MOLD-ADJUSTMENT]**.

[START] button The indicator is normally on after controlling this button during the subschema, namely, **[FULL-AUTOMATIC], [SEMI-AUTOMATIC]** or **[AUTOMATIC MOLD-ADJUSTMENT]**.

[MOLD-OPENING] button The indicator is turned on after controlling this button in the **[MANUAL]** or **[MOLD-ADJUSTMENT]** working mode; the mold-opening is then performed, the indicator is OFF and the operation is stopped after releasing this button.

[MOLD-CLAMPING] button The indicator is turned on after controlling this button in the **[MANUAL]** or **[MOLD-ADJUSTMENT]** working mode; the mold-clamping is then performed, the indicator is OFF and the operation is stopped after releasing this button.

[EJECTOR ADVANCE] button The indicator is turned on after controlling this button in the **[MANUAL]** working mode, the ejector pin advance is then performed; the indicator is turned off and the operation is stopped after releasing this button. It is better to eject based upon the ejection speed 1.

[EJECTOR RETREAT] button The indicator is turned on after controlling this button in the **[MANUAL]** working mode, the ejector pin advance is then performed; the indicator is turned off and the operation is stopped after releasing this button. It is better to retract based upon the retreat speed 1.

[MULTI-EJECTION] button The indicator is turned on after controlling this button in the [MANUAL] working mode, the multi-ejection series operation is then performed with thimble; the indicator is turned off and the operation is stopped after releasing this button.

[INJECTION] button The indicator is turned on after controlling this button in the **[MANUAL]** working mode, the injection is then performed; this indicator is turned off and the injection is stopped after releasing this button.

[PLASTIC-PUMPING] button The indicator is turned on after controlling this button in the **[MANUAL]** working mode, the plastic-pumping is then performed; this indicator is turned off and the plastic-pumping is stopped after releasing this button.

[COLLOSOL] button The indicator is turned on after controlling this button in the **[MANUAL]** working mode, the collosol is then performed; this indicator is turned off and the collosol is stopped after releasing this button.

[CORE-IN A] button The indicator is turned on after controlling this button in the **[MANUAL]** mode, and then perform the core-in operation; the indicator is then turned off and stopped after releasing this button.

[CORE-OUT A] button The indicator is turned on after controlling this button in the **[MANUAL]** mode, and then perform the core-out operation; the indicator is then turned off and stopped after releasing this button.

[CORE-IN B] button The indicator is turned on after controlling this button in the **[MANUAL]** mode, and then perform the core-in operation; the indicator is then turned off and stopped after releasing this button.

[CORE-OUT B] button The indicator is turned on after controlling this button in the **[MANUAL]** mode, and then perform the core-out operation; the indicator is then turned off and stopped after releasing this button.

[MOLD-ADJUSTMENT ADVANCE] button The indicator is turned on after controlling this button in the **[MOLD-ADJUSTMENT]** working mode, the mold-adjustment advance is then performed; the indicator is turned off and the operation is stopped after releasing this button.

[MOLD-ADJUSTMENT RETREAT] button The indicator is turned on after controlling this button in the **[MOLD-ADJUSTMENT]** working mode, the mold-adjustment retreat is then performed; the indicator is turned off and the operation is stopped after releasing this button.

[FORWARD SEAT] button The indicator is turned on after pressing this button in the [Manual] working mode, the forward seat is then performed, the indicator is turned off and the operation is stopped after releasing this button.

[BACKWARD SEAT] button, the indicator is turned on after controlling this button in the **[MANUAL]** working mode, the backward seat is then performed; the indicator is turned off and the operation is stopped after releasing this button.

[MOVALBE PLATE BLOWING] button In the **[MANUAL]** working mode, the indicator is turned on after pressing this button in the safety close process, the moveable plate blowing is then performed; the indicator is turned off and the operation is stopped after releasing this button.

[STATIONARY PLATE BLOWING] button In the **[MANUAL]** working mode, the indicator is turned on after pressing this button in the safety close process, the stationary plate blowing is then performed; the indicator is turned off and the operation is stopped after releasing this button.

[MANUAL BACKPRESSURE] button It can not be used now.

[TRIAL EJECTION] button It can not be used now.

[AUTOMATIC MOLD-ADJUSTMENT] button, the indicator is normally on after pressing this button in the **[MOLD-ADJUSTMENT]** working mode; the indicator is normally on after controlling the **[START]** button again, the automatic mold-adjustment is then performed. The **[AUTOMATIC MOLD-ADJUSTMENT]** is performed the automatic mold-adjustment function based upon the parameter setting based upon the “high-pressure” (desired clamping force, for example: 80T×50%=40T) in the [Mold opening/clamping] screen and the one inside the “installation mold”. Other working modes can be switched when the indicator of the “START” button is OFF after the mold-adjustment operation is performed. If you want to stop this operation in the halfway, press the “stop” button.

[AUTOMATIC MATERIAL-CLEANING] The indicator is normally ON after pressing this button in the **[MANUAL]** working mode (The seat-basement should be retreated to the limit position when the material-cleaning protective switch is disconnected; the seat-basement should not be moved to the limit alarm position when the material-cleaning switch is connected.) The automatic material-cleaning function is performed based upon the setting parameter inside the “material-cleaning” in the [Metering detail] screen. The indicator is automatically turned off and the operation is stopped after this process is executed. The indicator is turned off and the current material-cleaning is stopped if this button is pressed again when the automatic material-cleaning is being performed.

[USER 1] button It is reserved for the user, which is used for the customized button 1 of the function extension; it is temporarily defined as height adjustment damper or cutter tooth 1.

[USER 2] button It is reserved for the user, which is used for the customized button 2 of the function extension; it is temporarily defined as height adjustment damper or cutter tooth 2.

[LUBRICANT] button It can not be used now.

[GREASE] button Firstly, shift to the **[Production control]** screen, switch the "start" button following the "automatic grease-supplying frequency" into the "close", then press the **[GREASE]** button again; the indicator is normally on and the automatic filling grease is then performed; the indicator is turned off and the operation is stopped after the filling is completed.

[MOTOR] button The indicator is normally on after pressing this button. All of the motors' power inside the equipment is turned on; the indicator is turned off when this button is controlled again, and all motors's power is cut off.

[ELECTRIC HEATING] button The indicator is normally on after pressing this button, the electric heating part then starts its heating function. The indicator is turned off and the heating is stopped after controlling this button again.

[POWER ON] button The indicator is NORMALLY ON after controlling this button, which means that the operation system is started.

[POWER OFF] button The indicator is NORMALLY ON after controlling this button, which means that the operation system is closed.

[ESP] button It is only used for stopping the equipment in the emergency case. The power both the motor and electric heating of the system is cut off after pressing this button. After the emergency stop occurs, the [ESP] button can be controlled after the danger has been eliminated, and the indicator direction rotates releasing the emergency stop. (Do not use the common stop).

CHAPTER THREE SAFETY APPLICATION

In order to enhance the stability of the integral machine and avoid the hazard accident, it is important to read this User Manual and comprehend its content before installing and using this system. Abide by the installation described in the User Manual and the using safety specifications.

3.1 Safety Application

3.1.1 Definition of User

The technician of system maintenance

In this manual, the person who is performing the system maintenance is defined as [System maintenance technician]. That he who is trained with this system maintenance and acquainted with this installation system and operation, as well should gain the operation authorities from our company.

[System maintenance technician**]** should abide by the following precautions:

(1) It is better to inform the related operator that the operation can not be performed when the maintenance and detection are operated until mark a signboard “Do not operate it, system is being maintaining”;

(2) Confirm the ESP of the system and other safety switches can be correctly operated before performing;

(3) Do not pull out and insert each control cable related with system during operating;

(4) It is better to protect the multimeter probe (test pen) when metering with power, prevent against the short-circuit happens during metering;

(5) Ensure the related motor and the mechanism position is within the safety range when the movement parts are operated.

(6) The operation exceeded the system safety range should be firstly consulted the maintainer during the operation.

(7) Detect and confirm whether the related cable is connected reliably and correctly after the system maintenance is finished, as well the overall disassembly components have been installed correctly.

(8) When the maintenance detection is performed and returns to the normal operation state, confirm whether the equipment and miscellaneous device holds in the original state, and if it is in the usable state, notice the whole relative operators.

System Server

In this user manual, the high level maintenance professional during operating is defined as

[System server**]**.

[System server**]**, is the equipment operators of the GSK, or trained and gained the qualification from the GSK, can perform the following operations.

(1) The system installation uses the technical instruction;

(2) The elimination of the system malfunction.

The **[**System server**]** should comply with the above-mentioned “Precautions during working maintenance”, as the maintenance professional. It is very necessary to notice the accidents because the carelessness caused by the skillful for the equipment operators.

3.2 Safety Application Precaution

This system is fully considered for the security when designing. It is necessary to read and sufficiently comprehend this User Manual before installing and using, and ensure that the system can be reliably operated after installing.

3.2.1 Precaution of System Installation

The ESP is the upmost level safety precaution when the abnormity occurs. It is important to confirm this signal is connected and used normally before using the system. Otherwise, an unexpected result may occur.

3.2.2 Precaution for Guard Against an Electric Shock Hazard

- The power connection of the injection molding machine and accessory equipments should be installed the breaker, which should be operated with grounding.
- The insulation resistance (Check whether the electric heater is normal) should be measured once a year at least.
- The equipment can not be operated when the electrical control cabinet is opening, because the cabinet should be disassembled when the maintenance or detection is performed. So, it is necessary to cut the main breaker and then operate until the electrolytic capacitor is discharged (discharge 10s).
- The equipment innovation and modification can not be performed without the permission from the manufacturer.

The measures for guard against an electric shock hazard

The facility of the leakage breaker

The product delivered to your esteem company is not installed the safety

equipment such as the leakage breaker.

GB 10963-1989 Domestic and similar purpose breaker

GB 14048.2-1994 Low-pressure switch equipment and controllable equipment, Low-pressure breaker

GB 16916.1-1997 The remaining current motion breaker (RCCB) without OCP (over-current protection) for domestic and similar purpose The Part 1: General regulation

GB 16916.21-1997 The remaining current motion breaker (RCCB) without OCP (over-current protection) for domestic and similar purpose The part 2.1: General regulation is regardless of the RCCB applicability of the motion function and circuit voltage

GB 16916.22-1997 The remaining current motion breaker (RCCB) without OCP (over-current protection) for domestic and similar purpose The part 2.2: General regulation is related with the RCCB applicability of the motion function and circuit voltage.

GB 16917.1-1997 The remaining current motion breaker (RCBO) with OCP (over-current protection) for domestic and similar purpose The part 1: General regulation

GB 16917.21-1997 The remaining current motion breaker (RCBO) with OCP (over-current protection) for domestic and similar purpose The part 21: General regulation is regardless of the RCBO applicability of the motion function and circuit voltage

GB 16917.22-1997 The remaining current motion breaker (RCBO) with OCP (over-current protection) for domestic and similar purpose The part 22: General regulation is related with the RCBO applicability of the motion function and circuit voltage

GB 1984-1989 AC high pressure breaker

GB 4876-1985 The charge current on-off experiment of the circuit of the AC high pressure breaker

GB 7675-1987 The on-off capacity group experiment of the AC high pressure breaker

Supply the AC electric power equipment to the injection molding machine and others around it, it is recommended that this equipment should be installed based on the safety countermeasure when the abovementioned equipments are not set.

The slight high-frequency noise may occur when the inverter is being operated, because the different kind of the leakage breaker, the current may leak due to the high frequency, and then the malfunction occurs. Especially, it is recommended to use the braker (It is better to discuss with the GSK'S service center for the relative types and manufacturers.) with insensitive to the surge.

System Grounding

The power circuit filter is installed inside the control system, and therefore, the slight leakage current will go through the shell of the system; the electric shock hazard may occur if the unreliable grounding is performed. So, never attempt to install the use system without grounding.

Protective Grounding of Equipment

Connect the grounding terminal of the mechanical power and the factory power, so that the earthing can be performed practically. The protective grounding resistance should be less than 0.1Ω.

Inspection of Insulation Resistance

The inspection should be performed once yearly, for example, among the cables, cables other than the grounding, and the insulation resistance between the grounds. The voltage among the wires is below 300V, and the insulation resistance is more than 0.2MΩ; if the voltage is more than 300V, and its insulation resistance is above 0.4MΩ. It is necessary to check the insulation resistance at least once yearly, such as the motor, electric heater and other insulation states of the machines. When the insulation resistance is examined, do not offer the high voltage of the insulation resistance megameter in the CMOS circuit, servo motor controllable connector and the adjacent switches. The connection cable is cut off with the servo motor's terminal or the connector. Determinate the insulation resistance of the servo motor without the connection state, so that the internal circuit may be damaged.

3.3 Main Proceeding for Circuit

3.3.1 Controllable Circuit

The large amount of digit and analog integral component are used inside the injection molding machine controller, which are produced with the advanced electronic technique and possessed of the high reliability and durability and guaranteed the high performance and accuracy of the control system.

3.3.2 Precaution of PCB

The neutral part of this injection molding machine has several circuit boards inside the cabinet. The parts installed into these boards are used the most advanced electronic technique integrated circuit. In these integrated circuits, some IC contains of more than 10000 circuits, so the circuits are very compact, and greatly improves the reliability and extends its life span.

High pressure (such as the AC220V, AC380V) may occur during the system use equipment, if the pressure is applied to the control circuit board; it may be damaged the system, so it is important to pay attention to it when operating.

It is necessary to abide by the following items for the PCB:

(1) When the circuit is pull out, inserted, assembled or disassembled, the controllable power should be cut off, and then it can be performed after waiting for 10 seconds (the discharge time of the capacitor charging)

(2) Link the fixed card of the cable connector. The malfunction may occur due to the poor connection.

(3) When the welding or cutting (gas welding or electric welding) is performed nearby the control cabinet, close the door of the control cabinet.

3.3.3 Environment Setting

In order to protect the control equipment, it is necessary to avoid the following environments for the use conditions of the injection molding machine:

(1) The ambient temperature around the injection molding machine is more than the range of 0～40℃.

(2) The ambient humidity exceeds the place where it is more than 85%RH of which the place is concentrated because the rapidly temperature change.

(3) The place where is with the sunshine directly.

(4) The place of the strong electric field and high magnetic field.

- **The variation of the power voltage holds at the range of the ±10%. (It can not be exceeded at one moment.)**
- **The variation of the power frequency holds at the range of the ±1Hz.**
- **The injection molding machine can be stopped after the time of the simultaneous power-off is cut off one period.**
- **When it is used in the place where multiple simultaneous power-off, the continuous power equipment should be installed based upon requires.**

3.4 Requirement Proceeding of Auxiliary Equipment Installation

Due to the circuit is easily affected by electric flash, therefore, it is necessary to pay more attention to the following items when installing auxiliary equipments.

3.4.1 Grounding for Subsidiary Equipment

The cables of the equipments, such as the unloading machine, hopper dryer and mold temperature adjustor etc are concentrated on the main grounding terminator of the injection molding machine. Thus, the injection molding machine and all the peripheral machines are treated as the equal potential, it is added the safety and reduced the noise wave.

The reserved socket of the injection molding machine is a system based upon the above-mentioned grounding cables, which is connected with the grounding terminal of the injection molding machine, so if you use this socket, the grounding of the peripheral machines will be easier.

3.4.2 Grounding for Clutter Machine Generation

It is recommended that separate the power of the injection molding machine and the other machines (discharge processing machining, arc welding machine, commutator motor, and the total number changeable equipment of the silicon controlled etc.) generated the noise wave, the grounding system of the injection molding machine can not be shared a same place with the abovementioned the machines which may generate the noise wave. The grounding of the injection molding machine should be performed separately, which can be stably operated without any noise wave.

3.4.3 Measurement for Static Clutter

The transportation equipments (specially, deliver the plastic inside its plastic tube by the air) such as the plastic and molding product may generate an intense static noise wave. So, the grounding joint of the equipment is practically performed.

The material transportation tube should be used the shortest limit length, and depart from the controller and the screw position detection encoder as much as possible when the channel is set. The molding product taken from the molds which do not pile nearby the operation panel, because the strong static may cause the malfunction of the equipment, so it is necessary to avoid it.

3.4.4 Shielding of Electromagnetic Equipment

When the injection molding machine grounding connection is performed nearby the equipment of the strong electromagnetic field, namely, the arc welding machine, discharging processing machine, and the high frequency heater, the equipment with the noise wave should be covered by the grounding metal shielding board.

3.4.5 Utilization of Internal DC Power

The AC power such as the DC24V, DC12V and DC5V inside the injection molding machine is specially used for its internal system, not for the power of the external equipment. Do not use this power on other purpose other than it is indicated in the User Manual. If you use it freely, it may cause the low voltage or the noise wave may issue, and the malfunction or other stoppage of this injection molding machine may generate.

3.4.6 Utilization of Thermocouple

The thermocouple used in the injection molding machine and a microscale voltage value may output based upon the temperature at the top of the temperature measure. This value is formed a digital signal by the signal amplification and A/D conversion, so the voltage that gives to the thermocouple circuit can not excessive, otherwise, the thermocouple amplification may be damaged, and therefore, pay attention to the following proceedings when using.

(1) Pay attention to the leakage of the electric heater, which should be changed it as for the one with poor insulation. Specially, the mold may be leaked using the mini electric heater, so check the insulation resistance periodically.

(2) When the thermocouple top connected with the circuit should be disassembled from the mold and heater hopper, do not put the static on the metal part of the thermocouple. In this case, it is recommended that the top of the thermocouple is temporarily connected with the metal parts such as the frame of the injection molding machine.

3.5 Touch Screen Calibration

It is better to recalibrate it when the deviation of the clicking accuracy of the touch screen occurs.

Enter the [StyleSet] page from [I/ODiagnosis], and then enter into the calibration page as long as pressing the

. Press the big cross center where appears on the screen, and then the cross moves to the next position, consecutively press it until the end of the calibration. The time for pressing time should be more than 2s. It is better to touch the factory to change it if the calibration can not be performed or the operation still can not be operated after calibrating.

CHAPTER FOUR OPERATION

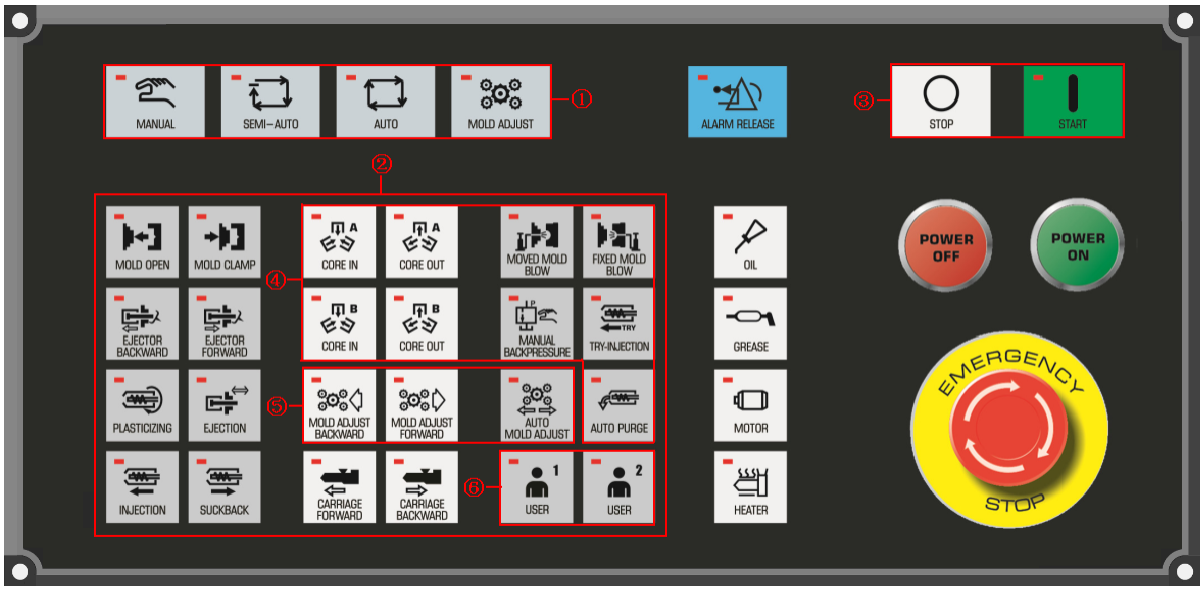
4.1 Operation Brief

Mainly, this chapter is introduced the corresponding functions of the operation system in each stage of the injection molding machine.

4.1.1 System Working Mode

The system has four kinds of working modes: 1. **[MANUAL]**; 2. **[SEMI-AUTOMATIC]**; 3. **[FULL-AUTOMATIC]**; 4. **[MOLD-ADJUSTMENT]**. The working modes (For example, the figure ①) can be shifted by the buttons on the miscellaneous panel, which can not be operated simultaneously. Different working modes can be chosen based upon your circumstance, and the four modes will be introduced below.

The button classification figure of the auxiliary operation panel



①: The button area of working mode selection;

②: The same operation button area for both the **[MANUAL]** and **[MOLD-ADJUSTMENT]** modes;

③: The operation button of **[START]** or **[STOP]** button of the system **[SEMI-AUTOMATIC]** or **[FULL-AUTOMATIC]** or **[AUTOMATIC MOLD-ADJUSTMENT]**;

④: Dedicate operation button area of **[MANUAL]** mode;

⑤: Dedicated operation button area of **[MOLD-ADJUSTMENT]** mode;

⑥: User selection button area (At present, it is temporarily defined as height adjustment damper/cutter tooth function).

- When the system is turned on, the manual mode is started by default.
- The operation of each mode, refer to the switch conditions among the modes and the system response after shifting in the Section 4.2.2 in this manual.

4.1.1.1 [MANUAL] Mode Explanation

[MANUAL] Mode is mainly used for the system debugging at the first time and the operation for a certain movement after the produce dwells. It is necessary to enter the Manual mode when the ②④ areas buttons on the auxiliary operator panel should be performed by manual. Refer to the Section 4.2.2.2 (Manual Operation Mode) for the button explanations. The system will be controlled this operation by which the parameter is set by this operation when the button of a certain movement is pressed, till it is automatically stopped after the completion of the operation.

- The operation will be stopped too when releasing the button before the controllable operation does not completed.
- The system may be performed different treatments to the same operation with the [mold-adjustment] mode. Refer to the “[Mold-adjustment] mode explanation” for details.

4.1.1.2 [SEIM-AUTOMATIC] Mode Explanation

The system is automatically controlled the injection molding machine based upon the injection molding flow to complete a molding period from the clamping to the ejector, and then the machine is stopped. Refer to the Section 4.2.2.3 **[SEMI-AUTOMATIC]** Mode Operation in this User Manual for details. The purpose of the **[SEMI-AUTOMATIC]** mode is that the trial-production can be performed based upon the semi-automatic mode before entering the full-automatic batch-production mode. Judge whether the parameter is adjusted checking the productive quality, so that the batch-production can be performed.

- If you want to start the **[SEMI-AUTOMATIC]** or **[FULL-AUTOMATIC]** operation, the following contents should be applied:

(1) Mold-opening in-position, ejector backward in-position, screw backward in-position (metering collosol in-position);

(2) Motor's power ON, electric heat power is ON and its temperature reaches the setting value;

(3) Motor is on the static state;

(4) Safety door closes;

The system alarm may occur pressing the **[START]** button if the above-mentioned contents are not applied.

It is better to use the **[MANUAL]** mode if it does not be performed the in-position; adjust the in-position by hand.

4.1.1.3 [FULL-AUTOMATIC] Mode Explanation

The injection molding machine can be mass-produced after the system enters the **[FULL-AUTOMATIC]** mode, which is same as the **[SEMI-AUTOMATIC]** mode; the system does not stop instead of beginning a new period after a molding period is completed, till the production plan is finished. Refer to the Section 4.2.2.4 Full-automatic Operation Mode for the details.

4.1.1.4 [MOLD-ADJUSTMENT] Mode Explanation

It is necessary to enter this mode if the mold-adjustment is needed to be performed. The buttons on the miscellaneous panel can be operated, namely, the ②, ⑤ in the following figure, refer to the Section 4.2.2.5 **[MOLD-ADJUSTMENT]** Mode Operation for details.

Mold-adjustment (molding thickness adjustment) is adjusted the mold-clamping mechanism position based upon the thickness of the mold; so that its elbow can be entirely extended reaching the top clamping force. It can be performed with the Manual or Automatic mode, usually, select the automatic mold thickness to adjust it. The **[AUTOMATIC MOLD-ADJUSTMENT]** operation should be performed when the following cases are generated:

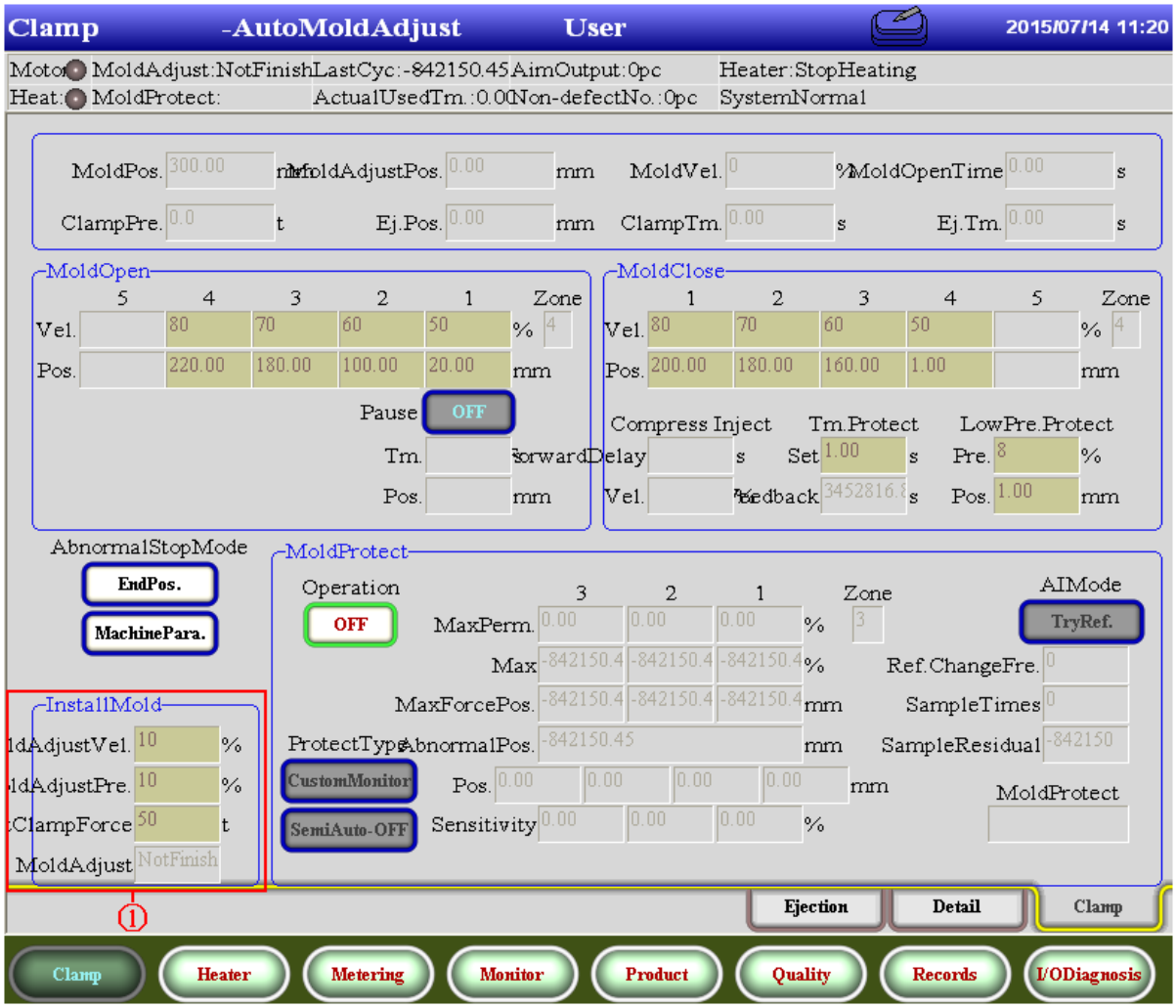
(1) After the mold is installed;

(2) Change the setting value of the mold thickness or "high-pressure mold-clamping force";

(3) After the mold-adjustment is performed by manual;

(4) The mold heating can be performed after its stable temperature lasts for a period time.

- The operation is performed in the **[MOLD-ADJUSTMENT]** mode; the system controls the motor's operation based upon the parameter setting of the InstallMold on the page of the "Clamp", which is shown as the following figure ①. It is different with the operation of the **[MANUAL]** mode.



4.1.2 Function Configuration Before Injection

It is better to inspect the following items before operating the machine.

4.1.2.1 Motor Start & Stop

(1) Start the motor

The indicator on the button is ON after the

[MOTOR] button on the miscellaneous panel is controlled.

(2) Stop the motor

The indicator on the button is OFF after the

[MOTOR] button is controlled.

4.1.2.2 Mold-Clamping & Mold-Opening

(1) The operation of the mold clamping

① Close the safety door → ② Enter the [MANUAL] mode→③ Press

→④ Start the mold-clamping operation

Notice

- Do not perform the interrupted mold-clamping operation when the high speed clamping is performed. It is better to set the clamping speed at the low one if the interrupted operation will be performed.

(2) Mold-opening operation

① Close the safety door →② Enter the [MANUAL] mode→ ② Press the

→④ Start the mold-opening operation

4.1.2.3 Ejector Operation

① Close the safety door→ ② Confirm the clamping plate at the mold-opening position → ③ Set the [Ej.ON] after entering the [Ejection] page→ ④ Press the

[EJECTOR ADVANCE] or

[EJECTOR RETREAT] or

[MULTI-INJECTION] →⑤ Start the ejector operation.

The velocity and position parameters of the ejector motion are set by [Ejection] page.

Notice

- The ejector would not be operated if the mold does not reach to the mold-opening stop position;
- It is necessary to stop the safety door;

- When the ejector is adjusted, the ejector stroke is regulated as short as possible at the beginning for guard against the damage of the mold; and then improve the stroke step by step till to the desired ejector one.
- When the ejector is operated, it is better not take out the product from the mold's top or bottom by your hand to prevent against the accident.

4.1.2.4 Operation of Ejection Equipment

Press the

[INJECTION UNIT FORWARD] key, the ejection equipment forwards to the mold; press

[INJECTION UNIT BACKWARD] key, the ejection equipments backwards. If the move is reverse, replace any of two phases' power of the carriage motor. Stop the move when touching the limit switch. Note: firstly use the [mold-adjustment] mode, after the power is turned on at the first time; confirm that the directions between the mold-adjustment advance and mold-clamping are normal, and then ensure the forward seat direction.

4.1.2.5 Mold Installation

(1) Ensure the used installation specification of the machine; refer to the "InstallMold" in the [Clamp] page**;**

(2) Mold installation; refer to the Section 4.3.1.1.1 Mold Installation for details;

(3) Adjust the position of the ejector pin and its quantity to fit the mold;

(4) Adjust the automatic mold thickness;

4.1.2.6 Screw Operation

The movement modes of the screw are vary from the operations, for example, injection, plastic-pumping, collosol, material-cleaning and screw operation, and refer to the following items:

(1) **[INJECTION]**

The screw directly forwards with a constant speed when the injection is operated.

In the **[MANUAL]** mode, press

key, the screw moves based upon the pressure set by "1" of the "Inj.Pre." and the speed set by "1" of the "Inj.Vel.", and then it is stopped after reaching to the position value set by the "V-PShift".

When the **[SEMI-AUTOMATIC]** and **[FULL-AUTOMATIC]** operations are performed, the screw will be operated injecting the related parameter based on the "Metering" page.

Refer to the Section 4.3.3.2 Injection Metering for details.

(2) **[PLSTIC-PUMPING]** (the screw retreats)

In the **[MANUAL]** mode, press the

[PLASTIC-PUMPING] key, the screw retreats to the "SD" setting position according to the speed value set from the "deceleration speed".

[SEMI-AUTOMATIC] and **[FULL-AUTOMATIC]** are automatically performed the plastic-pumping. Refer to the Section 4.3.3.2 Injection Metering for details.

(3) (**[COLLOSOL]** metering)

When the metering is performed, the collosol retreats along with the rotation of the screw.

In the **[MANUAL]** mode, press the

key, the screw will be rotated with the "Rot.Vel." setting speed to overcome the backpressure; it retreats to the "the 2nd section metering" setting position based upon the" Deceleration" is being set the speed. Note: The plastic may flow out when the backpressure is higher, to prevent the plastic from flowing, it is better to operate it by the plastic-pumping and collosol each other.

In the **[SEMI-AUTOMATIC]** and **[FULL-AUTOMATIC]** operation modes, the screw meters to the "the 1st collosol position" based upon the "the 1st collosol speed", and then meter to the "the 2nd collosol position" based upon the "the 2nd collosol speed"; the "Decompression speed" setting retracts to the "Metering end" position after the collosl (Screw stops revolving) is performed.

Refer to the Section 4.3.3.2 Injection Metering for the related parameters.

(4) [PurgeTemp.]

The material-cleaning is composed of three operations: [Inj.], [ForwardScrewBack] and [Mete.] .

The [ForwardScrewBack] is that the screw retreats to a certain distance to reduce the pressure after the injection packing is performed.

As for the material-cleaning operation, refer to the Section 4.3.3.2.3 Material-cleaning for details.

- In order to guard against the screw, firstly, check the protection precautions of the screw before operating it. Refer to the Section 4.3.3.2.3 Material-discharging

4.1.2.7 Temperature Control

(1) Cartridge heater temperature

Set the appropriate heating temperature to warm up based upon the selected material.

(2) Mold temperature

The temperature should be set if the mold heating should be performed; the insulating board should be installed when the molding temperature is higher.

Refer to the Section 4.3.2.2 Heating for the temperature setting.

(3) The forming temperature of the plastic and the mold temperature table is shown below (This is for your reference only, it is better to consult the material manufacturer for the upmost reasonable forming temperature).

Plastic name	English	Forming temperature ℃	Mold temperature ℃
Polystyrene/Stryron	PS	180～260	30～50
HIPS (High Impact Polystyrene)	HI-PS	170～260	30～50
Polypropylene – Butadiene - Styrol	ABS	190～260	40～70
Low Density Polyethylene	LDPE	160～260	30
High Density Polyethylene	HDPE	260～300	30～50
Polypropylene	PP	180～270	30～60
Soft Polrvinyl Chloride	PVC	150～180	20～50
Hard Polrvinyl Chloride	PVC	180～200	30～60
Polymethyl Methacrylate	PMMA	210～240	50～70
Polyformaldehyde	POM	190～210	40～80
Makrolon	PC	280～320	80～100
Polyamide 6	PA 6	240～260	80～110
Polyamide66	PA 66	260～290	80～110
Polyamide 610	PA 610		60～90
Polyethylene Terephthalate	PET	280	60～120
Polyethylene Terephthalate	PBT	250～270	80～110
Polyphenylene Sulfide	PPS	300～330	90～130

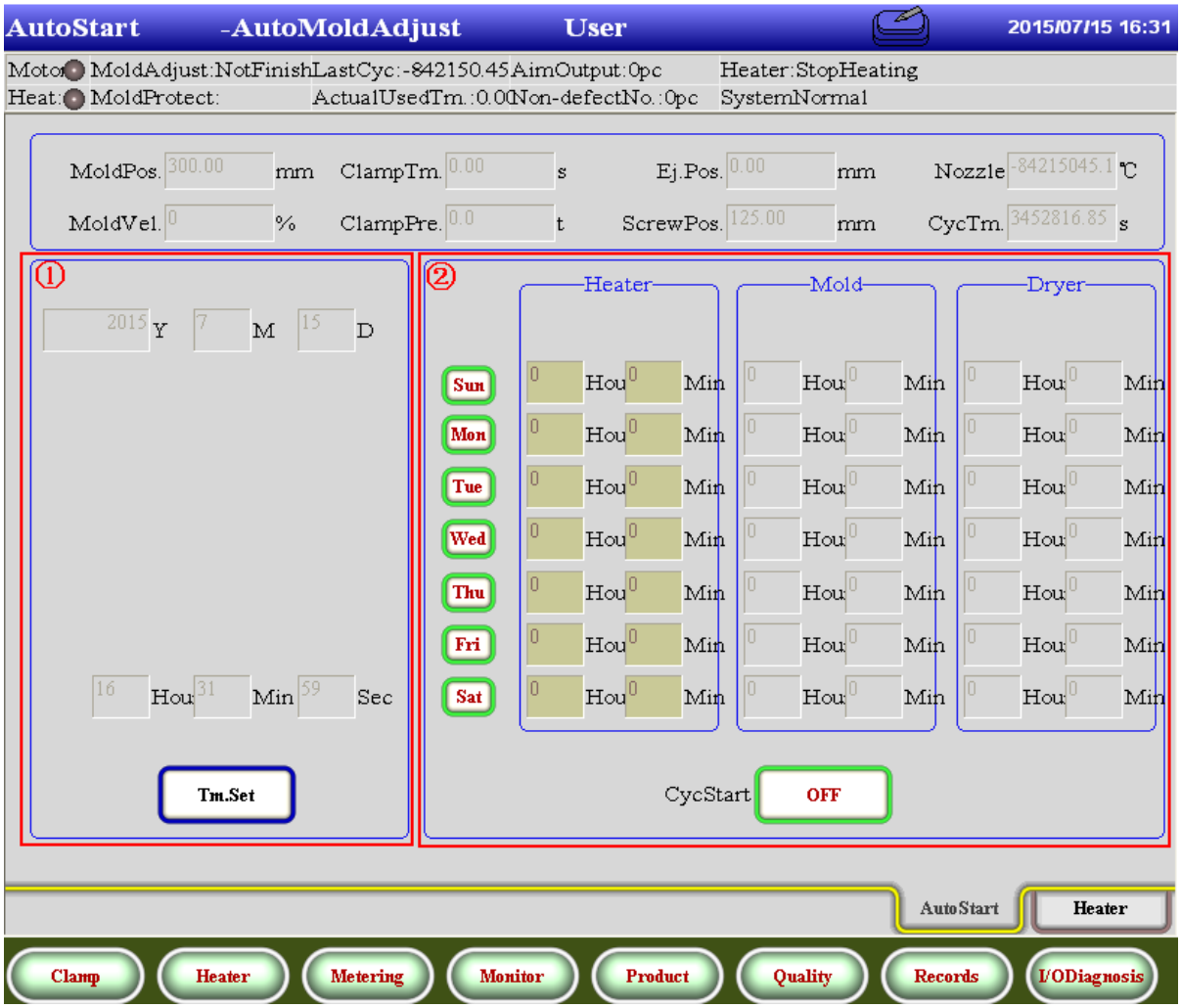
4.1.3 Injection Function Plan

The system is offered the automatic start heating function after the power is turned on.

4.1.3.1 Automatic Electric Heating Start

Enter the [AutoStart] page clicking the

button from the [Heater] page.



①: Display and modify the system time.

②: Plan to automatically start the heating item.

4.1.3.2 Automatic Electric Heating Setting Method Start

Step one: Calibrate the display data and time on the screen and its working data and time is normal.

Step two: Set the week and time.

Step three: Start the automatic start.

Step four: Confirm the

indicator is normally ON on the miscellaneous panel, and then complete the automatic start setting. Note: If the

indicator is OFF, the automatic heating function can not be started. In order to the safety, it is better to install an automatic open on the water-supply equipment.

4.1.4 Injection Condition Setting

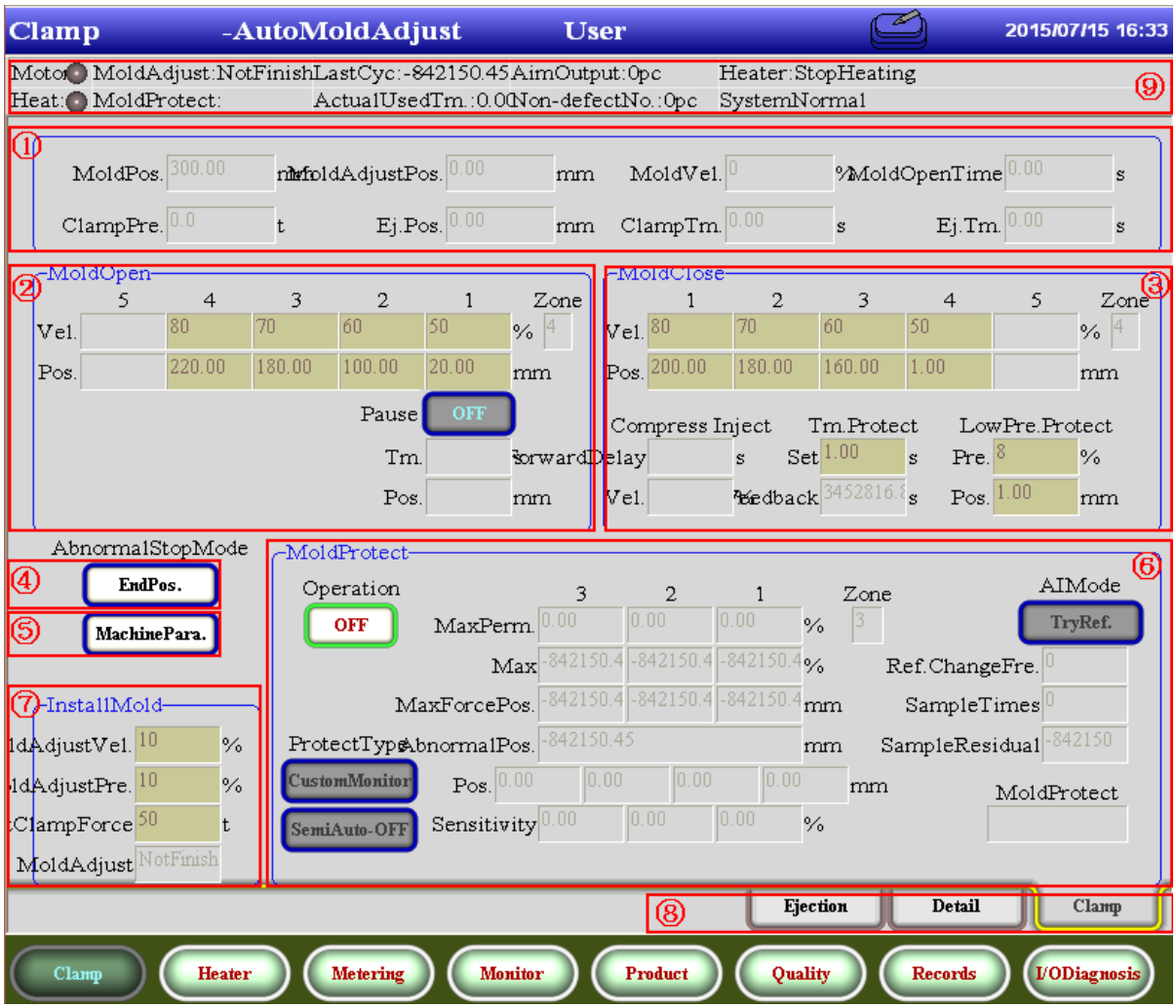
4.1.4.1 Read Parameter

The system offers the function the injection parameter of on the current setting. The saved parameter can be read that you can use the saved one as the current parameter. Refer to the Section 4.4.4.2 for details.

- The parameter range saved by the system is mold clamping/opening parameter, injection metering parameter, ejector parameter, temperature parameter, but the administration parameter does not include. It can be set again by the production status.
- It is better to save the current parameter before extracting the existing parameter.
- If the extracted parameter is the one which is the acceptable product for the previous production; the qualified product can not be consecutively performed after using it again; it is better to trial product at the first time.

4.1.4.2 Mold Opening/Clamping Parameter

4.1.4.2.1 [Clamp] page



①: Monitoring data area.

②: Mold-opening parameter area.

③: Mold-clamping parameter area.

④: Treatment method for the abnormal mold-clamping

⑤ : Check the machine specification.

⑥: The parameters for mold protection and foreign material check

⑦: Mold installation, mold-adjustment parameter area.

⑧: Page shift key.

⑨: Machine state column

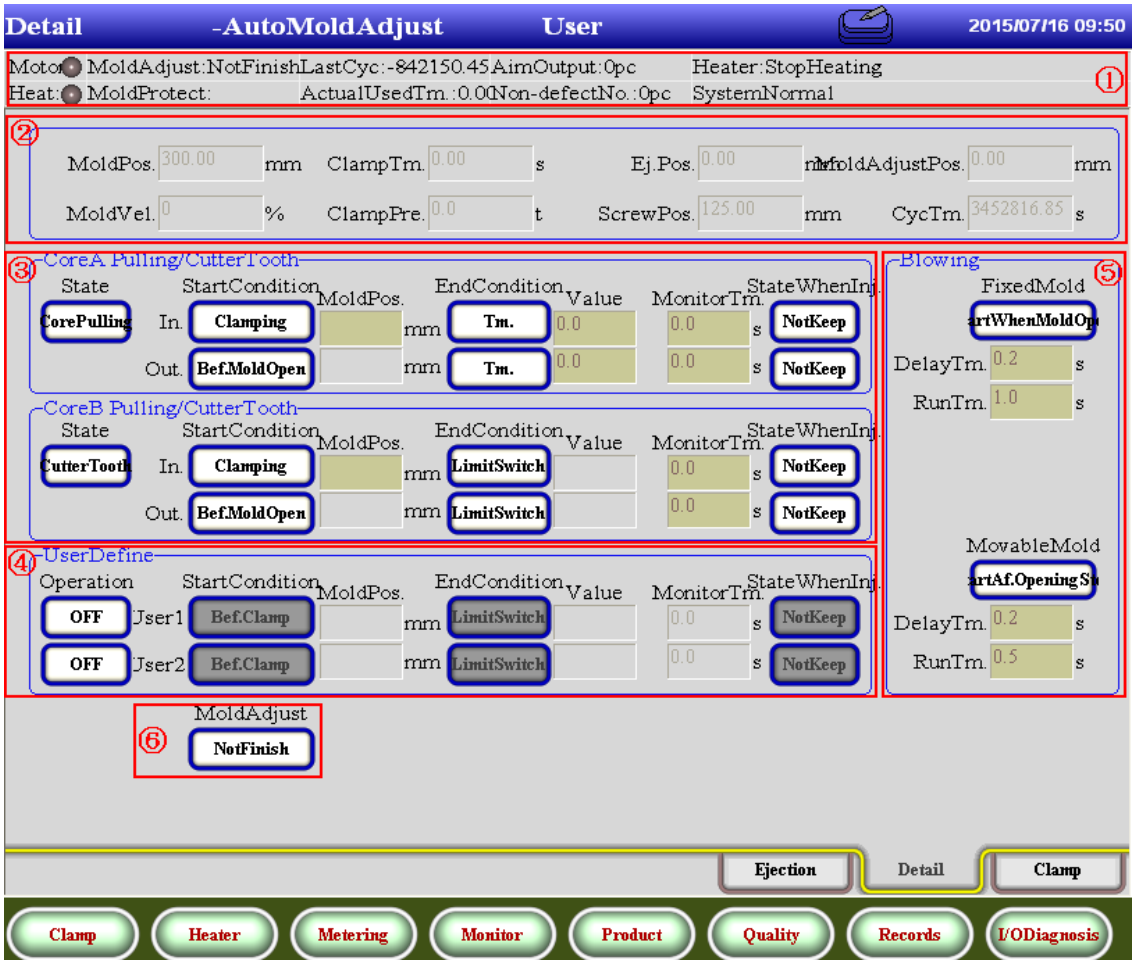
The mold opening/clamping can be manually operated after finishing the above-mentioned ②, ③ and ⑥.

The mold-parameter ⑦ is the movement parameter of the mold clamping/opening when the **[MOLD-ADJUSTMENT]** or **[AUTOMATIC MOLD-ADJUSTMENT]** is performed.

The mechanical parameter specification of the machine can be checked after entering ⑤.

Refer to the Section 4.3.1.1 Page of Mold Opening/Clamping for details.

4.1.4.2.2 The [Detail] Page



① : Machine state column.

② : Monitoring data area.

③ : Core- pulling parameter area.

④ : User definition area.

⑤ : Blowing parameter area

⑥ : Mold-adjustment status.

Refer to the Section 4.3.1.2 Detail of Mold Opening/Clamping for details.

4.1.4.3 Injection Metering Parameter

4.1.4.3.1 [Metering] Page

①: Injection metering time parameter area.

②: Injection speed and the screw position parameter area.

③: Metering parameter area.

④: V-P shift parameter area.

⑤: Injection pressure parameter area.

⑥: Packing parameter area.

⑦: “Data Expression” area

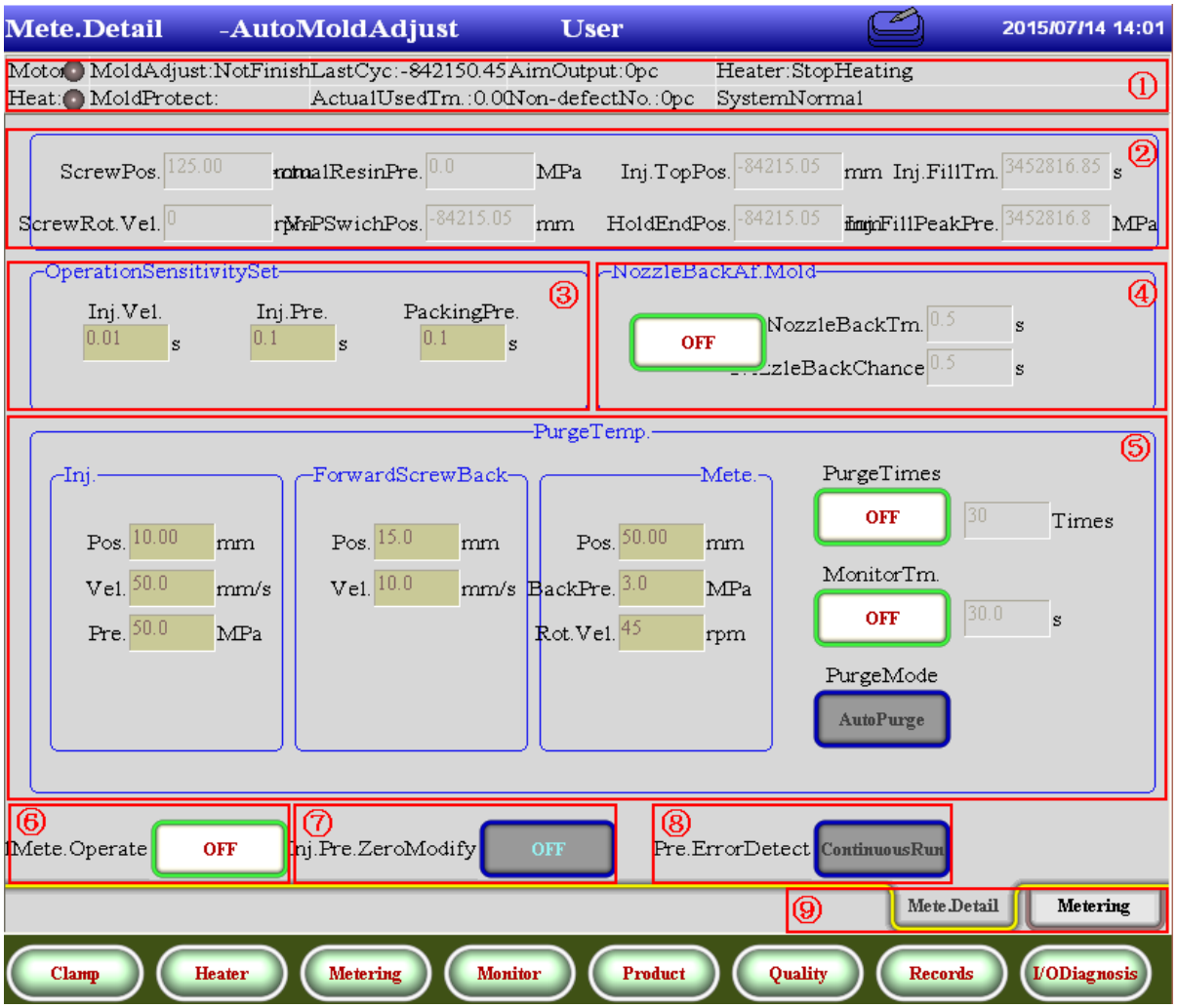
⑧: Page shift key.

The ejection (injection) operation can be performed in the manual mode after the values of the ④ [Pos.], ② “1” and ⑤ “1” are set; the plastic-pumping and the collosol (metering) operation can be performed after item ③ is performed

An integral injection metering operation can be formed after all parameters on the page are set.

Refer to the Section 4.3.3.1 Injection Metering for details.

4.1.4.3.2 [Mete.Detai] Page



① : Machine status column.

② : Monitoring data area.

③ : The parameter area of injection operation sensitivity setting.

④ : Nozzle retreat, metering function setting.

⑤ : Material-cleaning parameter area.

⑥ : [ParalMete.Operate] operation does not perform.

⑦ : Ejection pressure zero amendment.

⑧ : Pressure detection treatment. It is not perform yet.

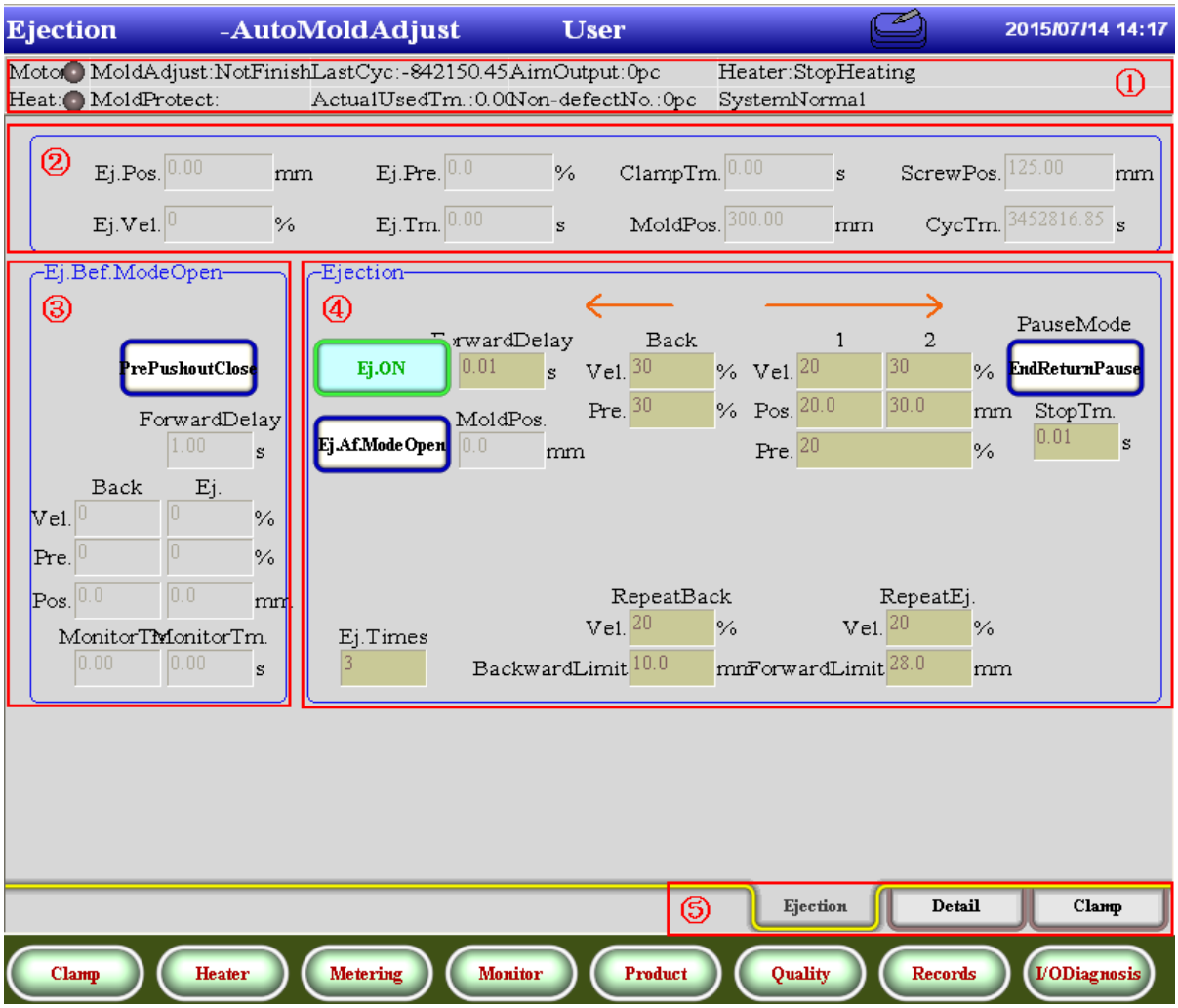
⑨ : Page shift button.

The parameters in the ③④⑤ areas are mainly controlled to the injection metering operation when it is performed in the semi-automatic or full-automatic

⑤ is the material-cleaning detail parameter setting.

Refer to the Section 4.3.3.2 Injection Metering for details.

4.1.4.4 [Ejection] page



① Machine status column.

② Monitoring data area.

③ Set the ejector parameter before the mold-opening.

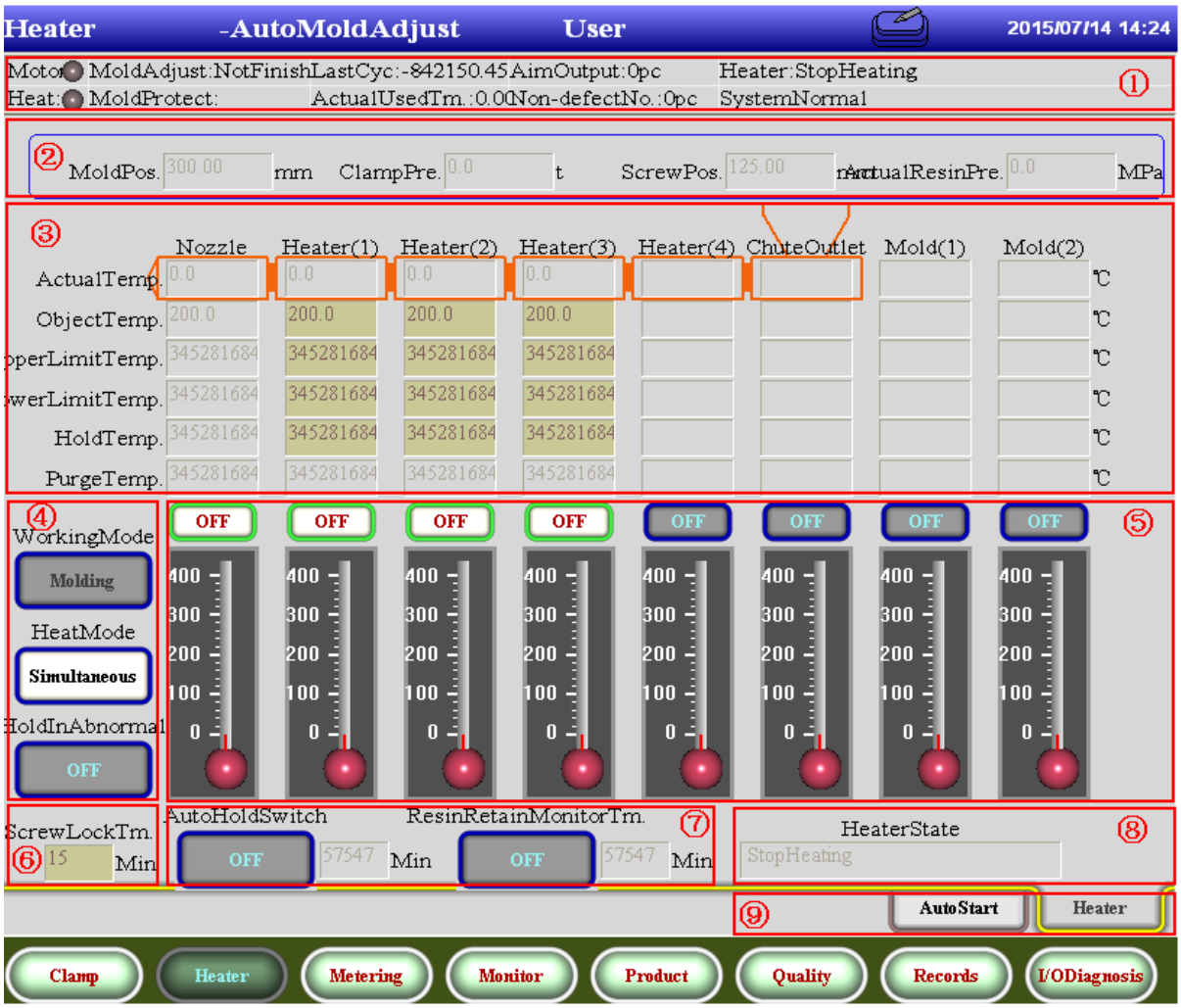
④ Ejector parameter area.

⑤ Page shift page.

Refer to the Section 4.3.1.3 Ejector for details.

4.1.4.5 Temperature Parameter

4.1.4.5.1 [Heater] page



① Machine status column.

② Monitoring data area.

③ The parameter setting area of the cartridge heater temperature

④ [WorkingMode] and [HoldInAbnormal] aren't working now.

⑤ Heating controllable status display area.

⑥ Cold start pretention time.

⑦ Automatic heat preservation shifting switch, resin detained monitoring time switch.

⑧ Current cartridge heater status.

⑨ Page shifting button.

Set the [ObjectTemp.] based upon the plastic type in ③.

The item ⑥ is that the screw may be damaged during operating when the plastic does not reach the setting temperature.

Refer to the Section 4.3.2.2.2 Cartridge Heater Page for details.

4.1.5 Confirm Before the Batch Production

4.1.5.1 Material-cleaning

The material-cleaning operation should be performed in the following cases:

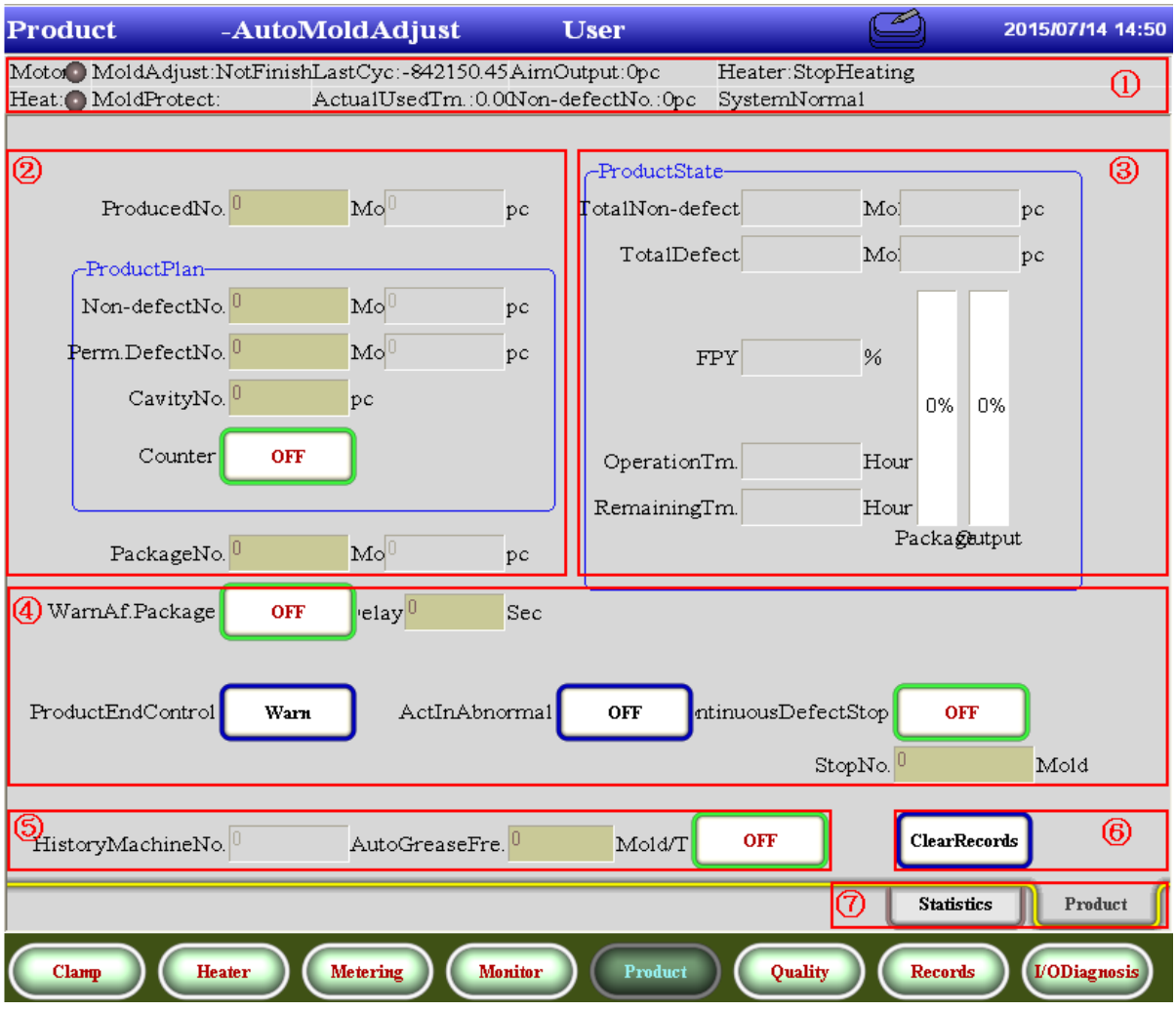
1. If the used plastic is a kind of decomposition resin of which the resin should be cleaned to guard against remain.

2. The color or the type of the raw material is changed.

3. After the batch production is performed, the cartridge heater should be performed the heating as short as possible before the next molding operation occurs.

Refer to the Section 4.3.3.2.3 Material-cleaning for details.

4.1.5.2 [Product] page



① Machine status column.

② The setting of the batch production quantity.

③ Products production status.

④ The production state treatment by the system.

⑤ Record the historical machining times and do not change. Set the automatic grease-supply

⑥ Clear the production record.

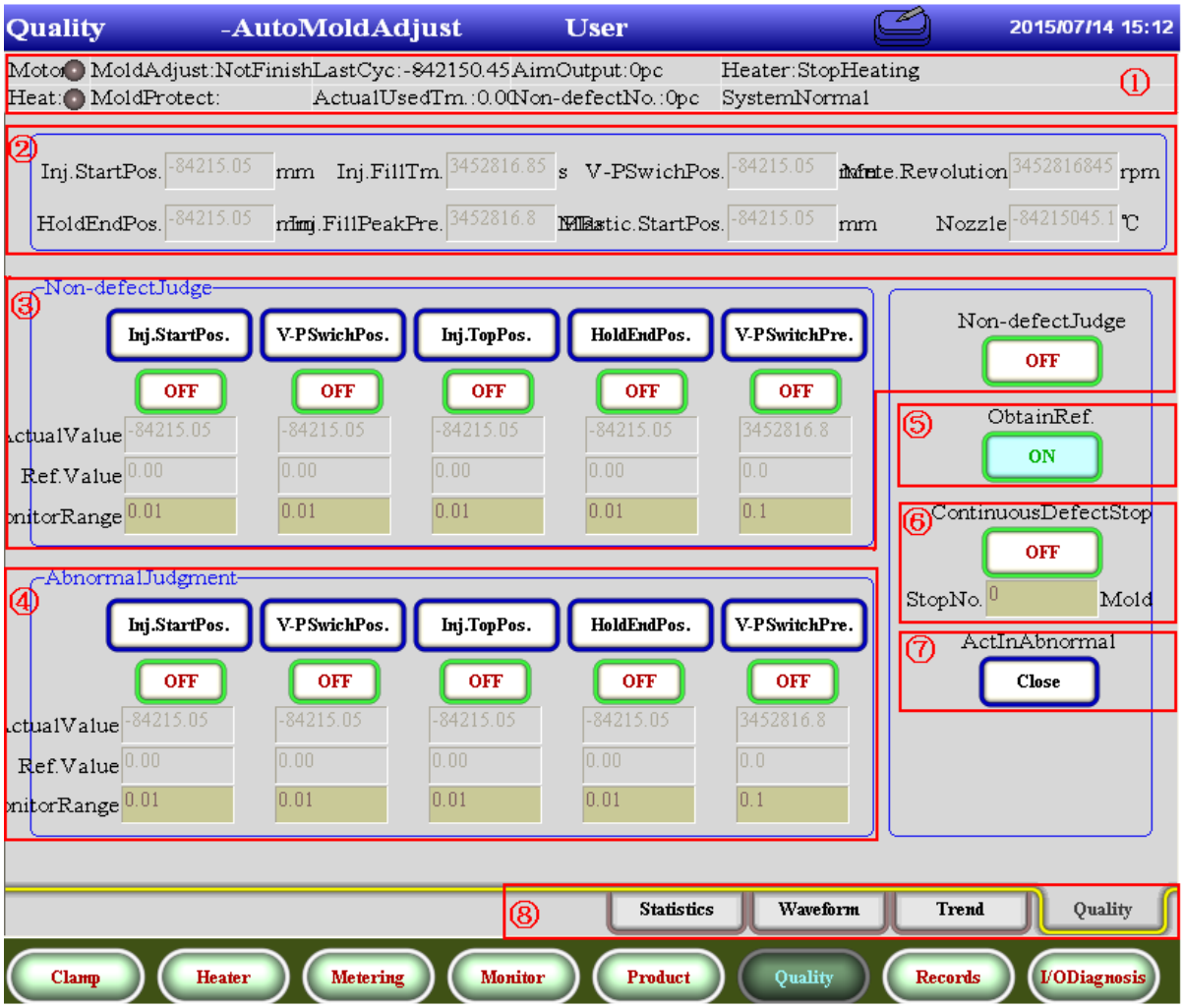
⑦ Page shift button.

Note: Firstly close the “Counter”, if you want to set the parameter in ②.

The system alarm may occur after a box of quality products are manufactured when the [WarmAf.Package] of item ④ is started. The production will be continued after the [Delay] is finished.

Refer to the Section 4.4.2 Production Management for details.

4.1.5.3 [Quality] Page



① Machine status column.

② Monitoring data area.

③ The part of certificated products judgment.

④ The part of abnormality judgment.

⑤ Reference value gain switch.

⑥ The retreatment part of consecutive inferior products.

⑦ Abnormal operation switch.

⑧ Page shift button.

If you want to get the reference value and the related parameter setting, refer to the Section 4.4.3 Quality Management for details.

4.1.5.4 [Trend] Page

① Machine status column.

② Monitoring data area.

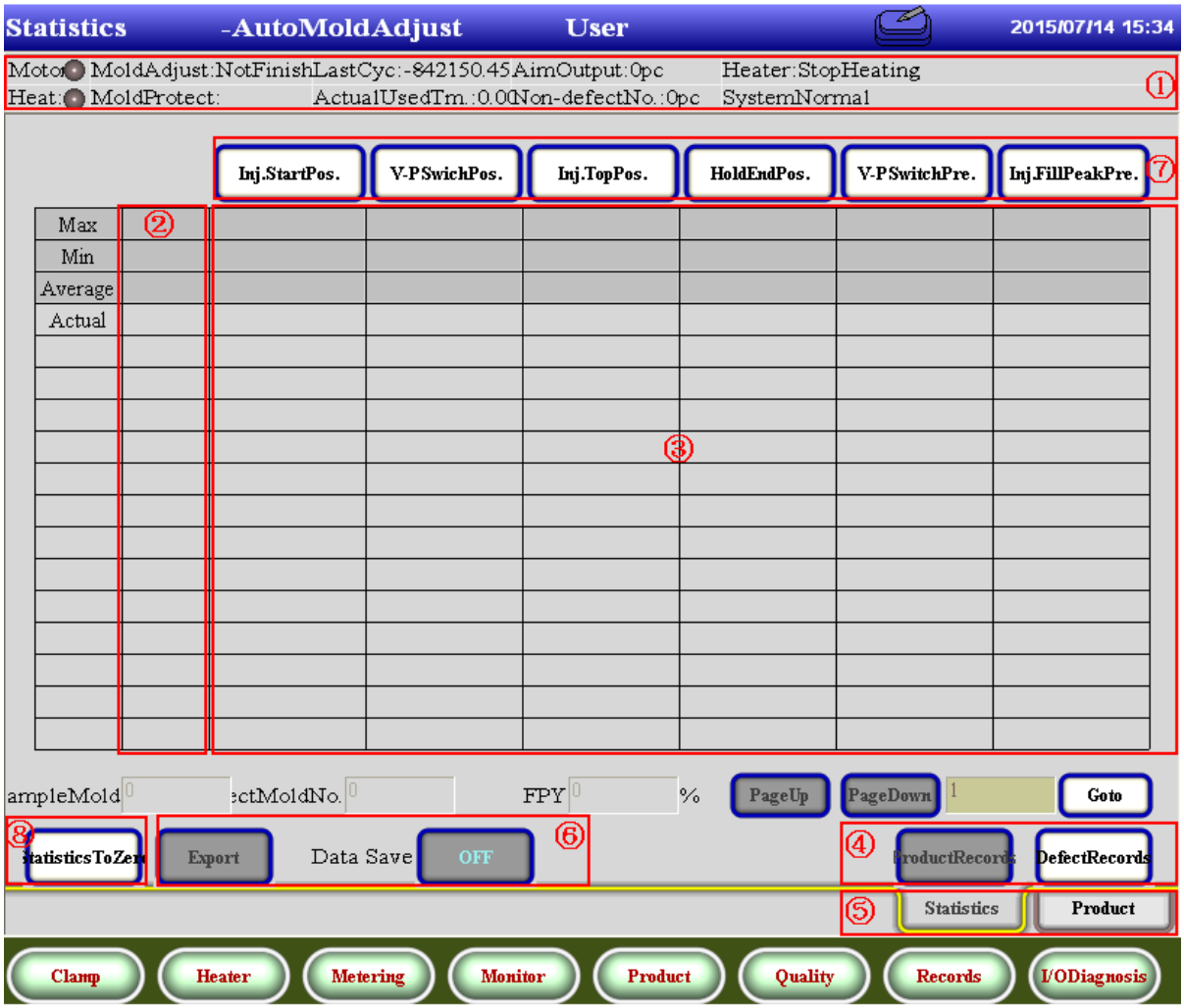
③ Select the displayed items, diagram data.

④ Operation diagram data

⑤ Page shift button.

Select the 4 data which is to be monitored and its wave displays with the chart. Refer to the Section 4.4.5 Tendency Chart for details.

4.1.5.5 [Statistics] Page



① Machine status column.

② The time of the start of each period.

③ Display the productive relevant module data during the batch production for the system.

④ Record type button selection.

⑤ Page shift button.

⑥ Statistics data leading-out button. **This function only can be operated in the manual state, simultaneously, the U disk is required.**

⑦ The selection button required for statistics. There are 16 subitems that can be selected.

⑧ The data button for clearing one statistics.

4.2 Miscellaneous Panel Button Operation

4.2.1 Preparation/Confirmation Before Operation

4.2.1.1 Reset Operation of ESP Button

(1) The alarm prompt [ESPWarn] occurs on the upper right corner after pressing the .

(2) The reset operation is performed based upon the arrow's direction of the [ESP]; the alarm prompt is cancelled at the upper right corner after resetting.

Warning

- The [ESP] button is used for immediately stopping the injection molding machine, which is only use in the emergency case instead of stopping the machine as usually.

4.2.1.2 Operation of Main Power ON

Step one: The power for switching on the main power.

Step two: Switch on the controllable system power.

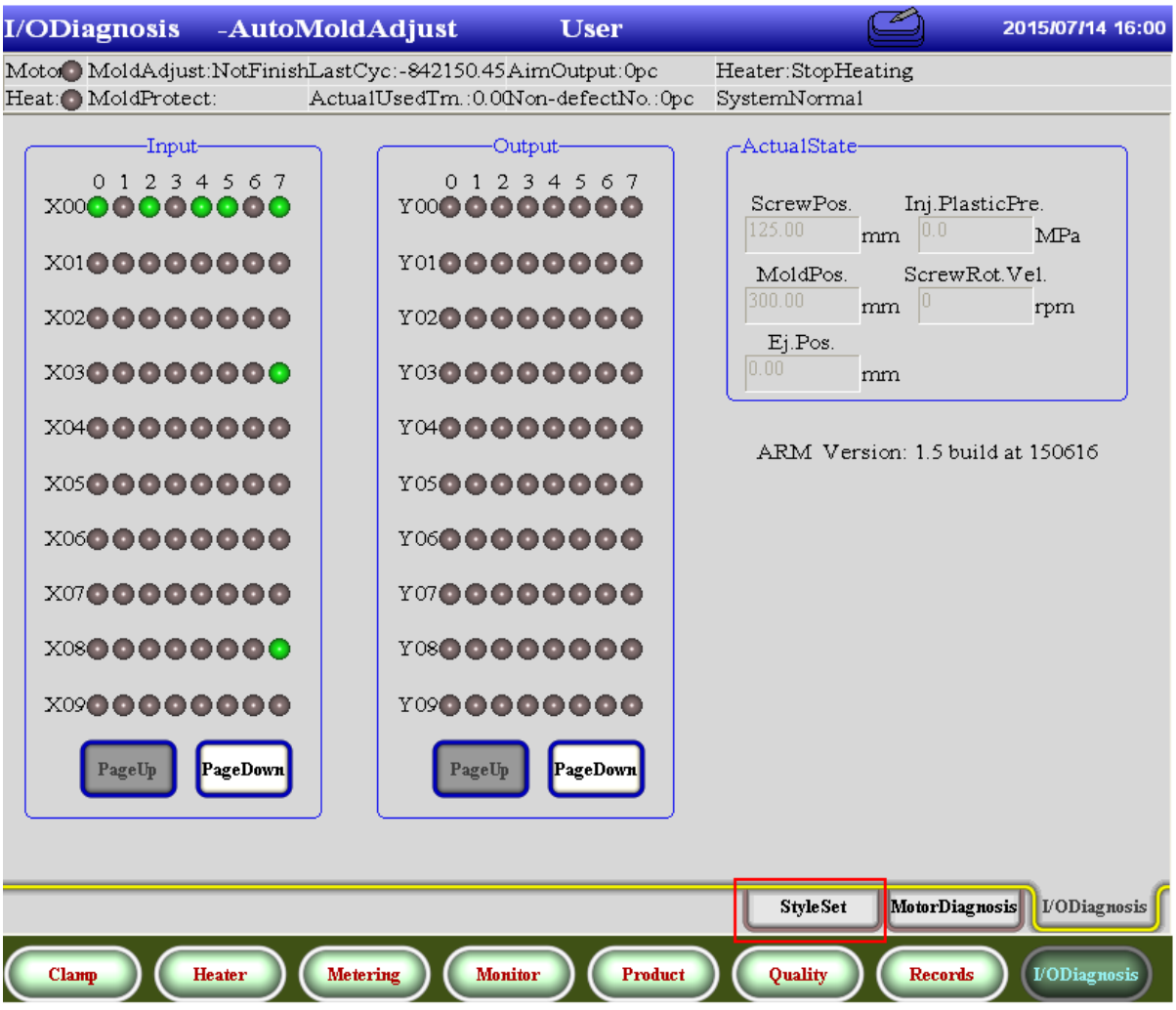
Step three: The default interface appears after the power is turned on

Prompt

- GSK6000 digit control system has a page display function after the machine is ON. The following operations are shown below:

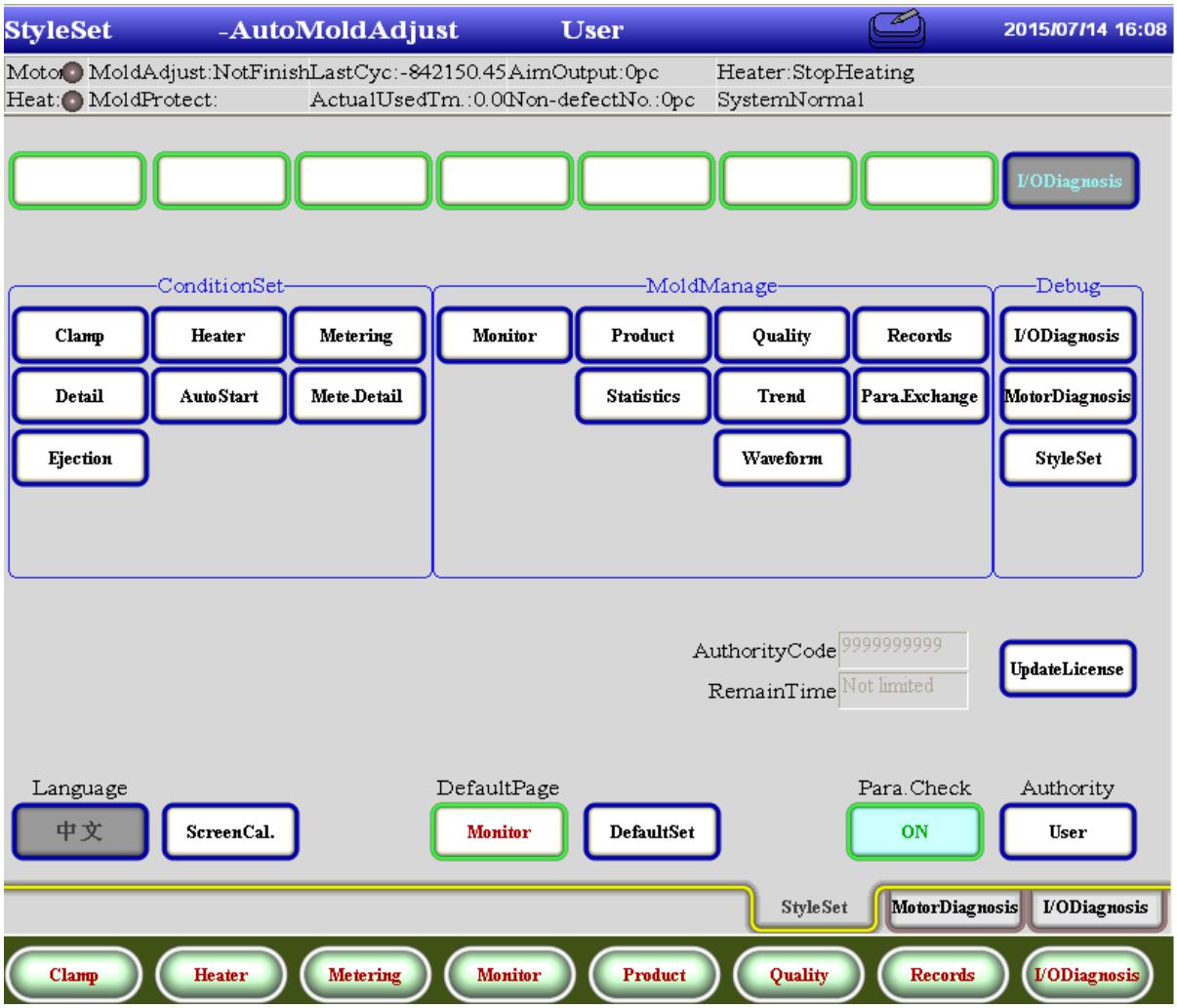
Step one: Press the

, then shift to the "I/ODiagnosis" interface on the "Monitor" interface.



Step two: Enter the "StyleSet" interface after pressing

.



Step three: Control the green frame button at the left of the

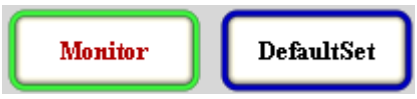
, and then select the setting page after the machine is ON.

Prompt

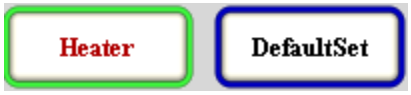
- For example: If user hopes the page is [Heater] one after the machine is ON, the following operations should be performed after entering the [StyleSet] interface.

Step one: Click the green frame button at the left of the

.



Step two: Select the user specified page (for example: the “Heater” interface).

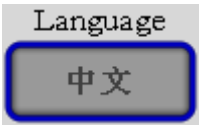


Firstly enter the user specified page after the control system is restarted.

- Press the

button to restore the system's default page ([Monitor] page).

4.2.1.3 System Language Selection

Control the 

button, the system may show the prompt frame for selecting between Chinese and English.

4.2.1.4 Motor's Power ON

The button indicator is normally ON after pressing

button, the motor is then started.

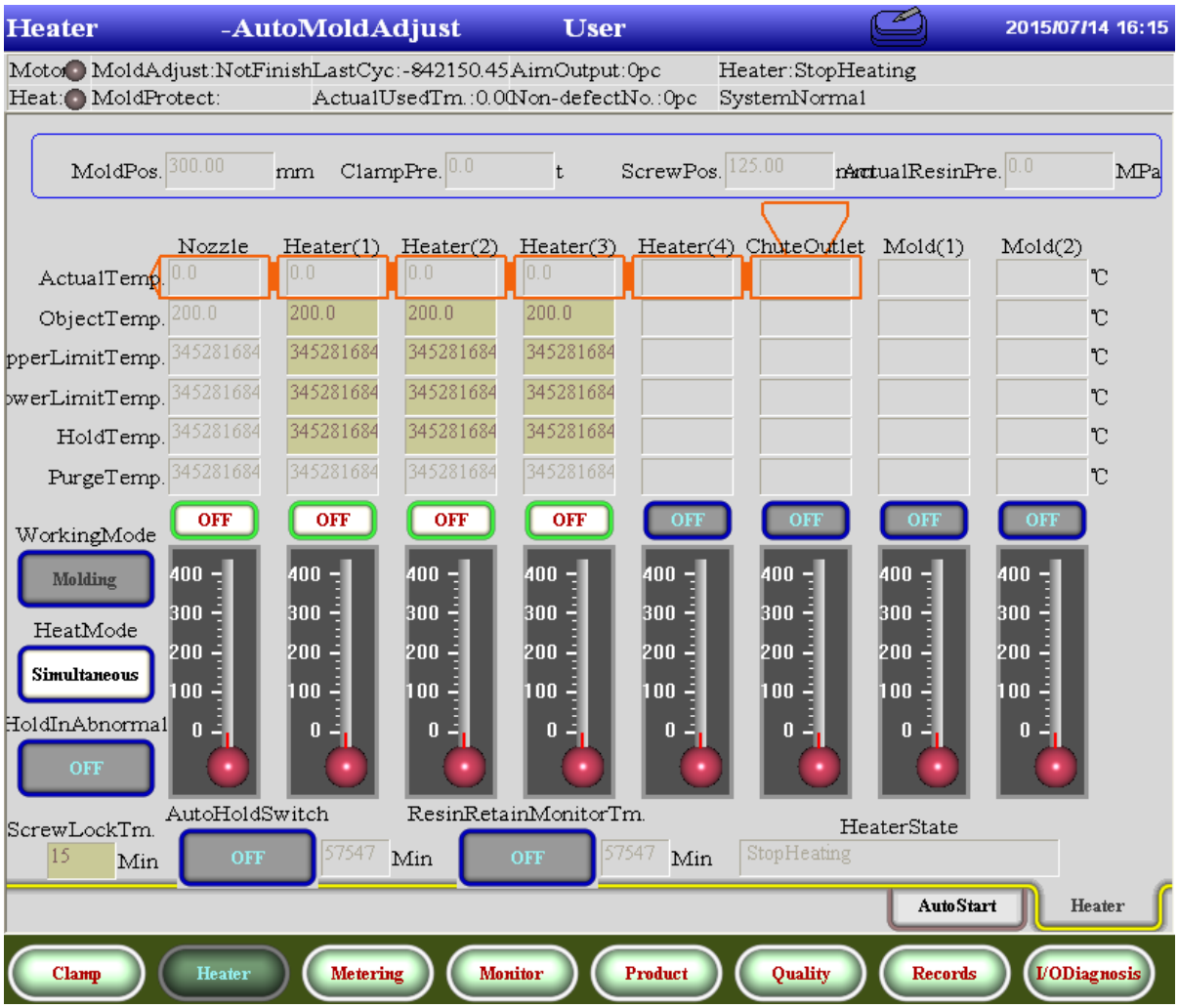
- The

button is used for switching on the strong current of the servo driver. The protection circuit should be set because the driver strong current may be generated the tremendous current impact during switching on, and therefore, do not frequently ON/OFF to the driver, otherwise, the normally alarm of the driver may occur. It is recommended that the motor only can be opened after the power is turned off for 6 seconds.

4.2.1.5 The Power ON of the Electric Heater

Step one: Shift to the "Heater" interface after pressing

button, and then set the appropriate temperature value.

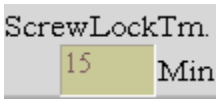


Step two: Confirm the cartridge heater state ([HeaterState])、object temperature ([ObjectTemp])、upper temperature ([UpperLimitTemp.])、lower temperature ([LowerLimitTemp.])、holding temperature ([HoldTemp.]) and material-clearing temperature([PurgeTemp.]).

Confirm the cartridge heater state, object temperature, upper temperature, lower temperature, holding temperature and material-clearing temperature.

Step three: Press the

button.



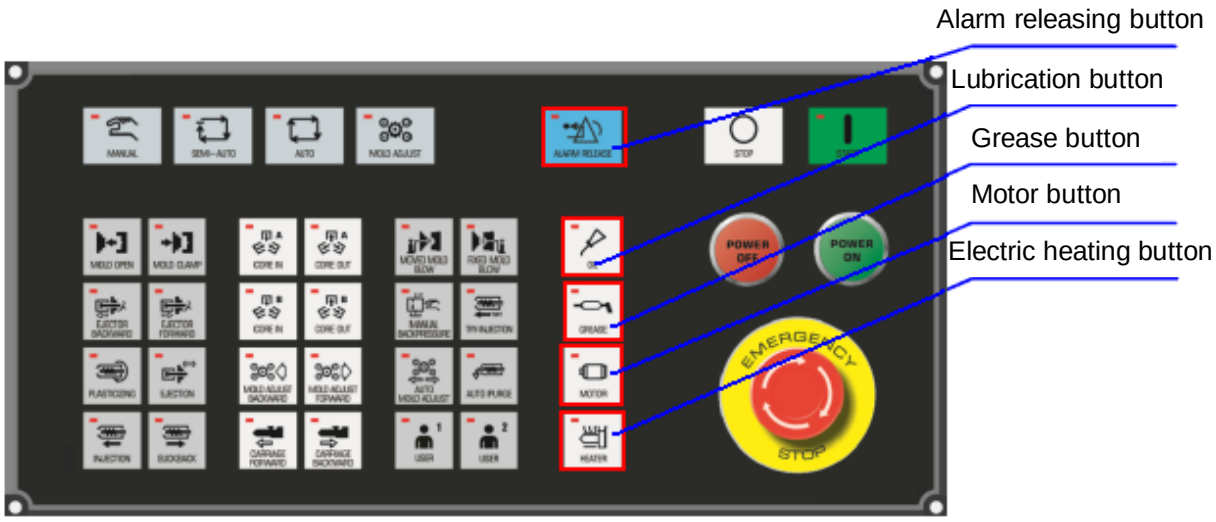
Prompt

- The “ScrewLockTm.” is the screw protection time against damaging the screw of which the material inside the charging barrel does not completely melt after preventing the temperature of the charging barrel reaches. The default cold-start time is 15 minutes.
- Refer to the Section 4.3.2.2.2 Heater Page for details.

4.2.2 Operations of Operation Modes

4.2.2.1 General-purpose Operation of Modes

The buttons on the auxiliary panel can be operated regardless of the **[MANUAL]**, **[SEMI-AUTOMATIC]**, **[FULL-AUTOMATIC]** and **[MOLD-ADJUSTMENT]**:



(1)

[MOTOR] button: The indicator is ON after pressing one button, and then the motor’s power is turned on. The power is turned off after press it again.

Notice

- In order to the safety operation, it is better to cut the power of the motor in the **[MANUAL]** mode.

(2)

[HEATER] button: The indicator is ON after pressing the button, and then the electric heater’s power is turned on. Cut off the electric heater’s power after pressing it again.

Notice

- In order to safety operation, it is better to cut off the electric heater's power in the **[MANUAL]** mode.

(3)

[GREASE] button: The corresponding indicator is ON after pressing the button, the lubrication is then started.

Prompt

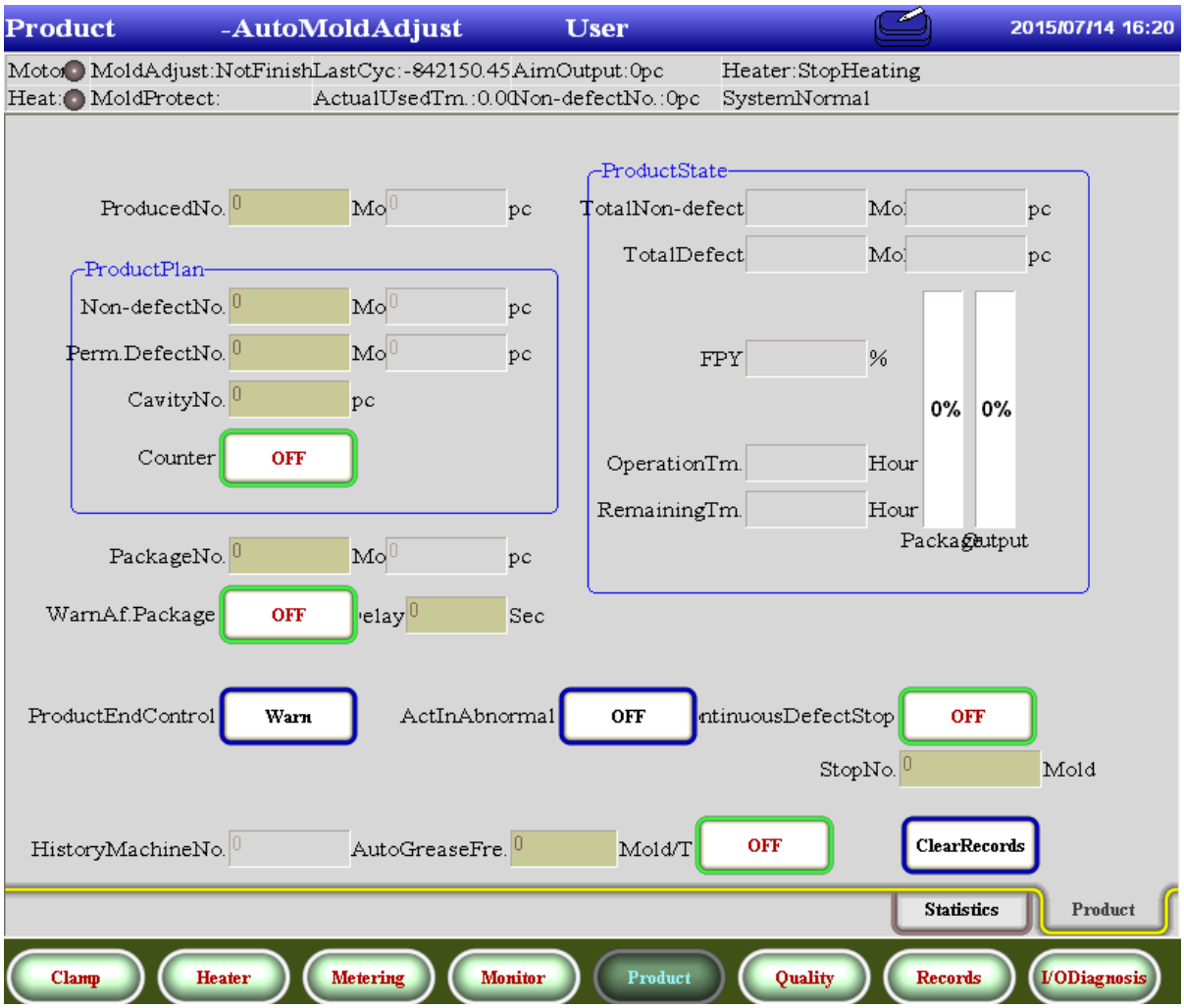
- GSK6000 control system can be carried out the grease-supply and automatic grease-supply:

  1) Automatic grease-supply. The

[GREASE] button is disabled in this grease-supply mode. The automatic grease-supply should be performed based upon the following steps:

  Step one: Enter to the [Product] interface by clicking the

button.



Step two: Set the data of the automatic grease-supply frequency ([“AutoGreaseFre.]) input frame.

Step three: Press the

button at the right after pressing the [AutoGreaseFre.] input frame, the button displays

, then the grease-supply switch is turned on. The automatic grease-supply then performs once after the control system is machined the module of the [AutoGreaseFre]”

2) Manual grease-supply:

Step one: Confirming the button at the right of the [AutoGreaseFre.] input frame displays

state; the automatic-supply function is then closed.

Step two: Press the

[GREASE], the grease-supply operation is then immediately started.

(4) In the case of emergency, press the

[ESP] button, the power both the electric heater and the motor is cut off, all of the operating motors are immediately stopped.

(5)

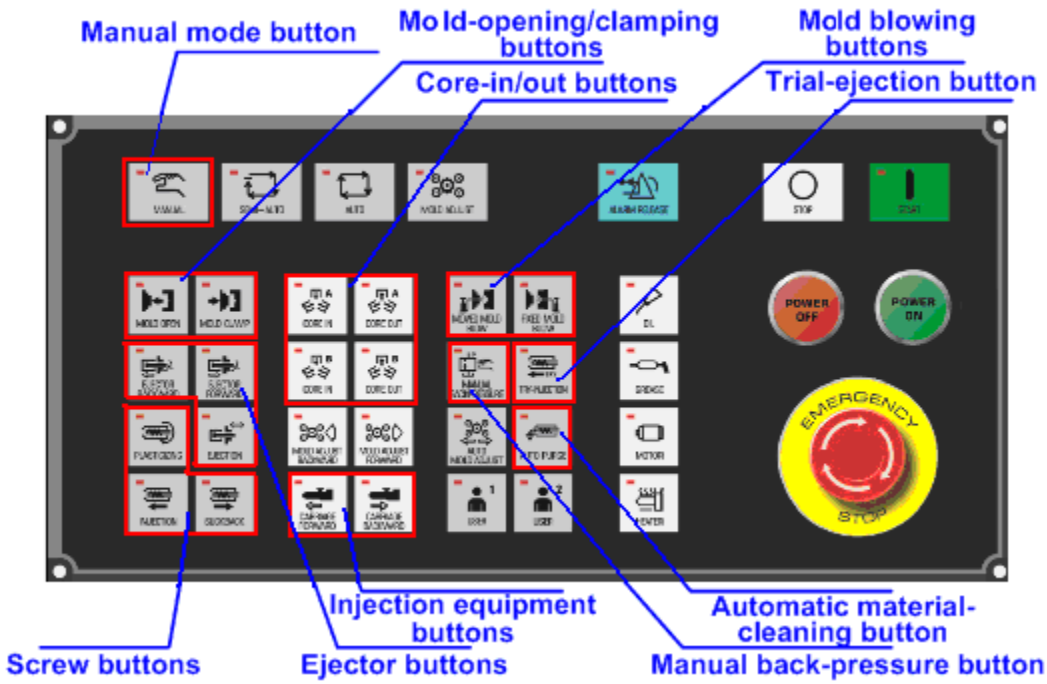
[WARN-RELEASING] button: the alarm prompt displays at the upper right corner on the controllable system interface. User can clear the alarm or the alarm prompt based upon the alarm resource which is displayed with the system after pressing this button, and then the other operations can be performed.

4.2.2.2 Manual Operation Mode

4.2.2.2.1 Button Operation Explanations both Operation Mode Shift ([Manual] mode) & Auxiliary Operation Panel.

Press the

[MANUAL] button, after the operation mode is set to the **[MANUAL]** mode, and then the following buttons can be operated.



(1) The button operation of the injection molding equipment

[SEAT FORWARD] button: The corresponding indicator is ON after pressing this button, the injection molding equipment forwards. Vice versa.

[SEAT BACKWARD] button: the corresponding indicator is ON after pressing this button, the injection molding equipment backwards. Vice versa.

(2) Ejector-pin button operation

[EJECTOR-PIN FORWARD] button: the corresponding indicator is ON after pressing this button; the ejector-pin is then performed. Vice versa.

[EJECTOR-PIN BACKWARD] button: the corresponding indicator is ON after pressing this button; the ejector-pin is then retreated. Vice versa.

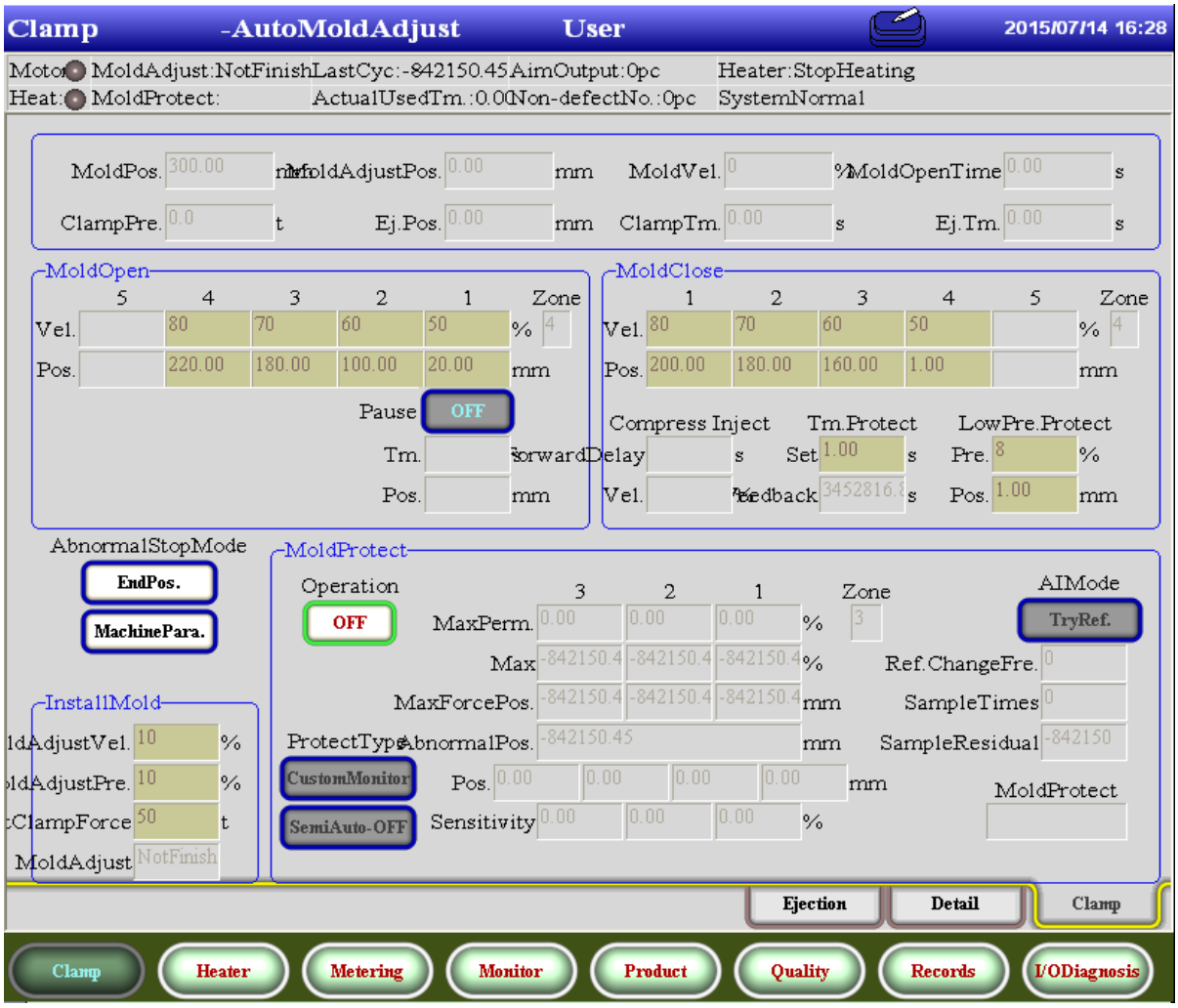
[MULTI-EJECTION] button: The corresponding indicator is ON after pressing this button, the multi-ejection of the ejector-pin is retreated. The ejection times can be set based upon the value in the ejection times ([Ej.Times]) input frame on the [Ejection] interface. The corresponding indicator is OFF after releasing this button; the ejector operation is then stopped.

- The advanced condition of the ejector button operation:

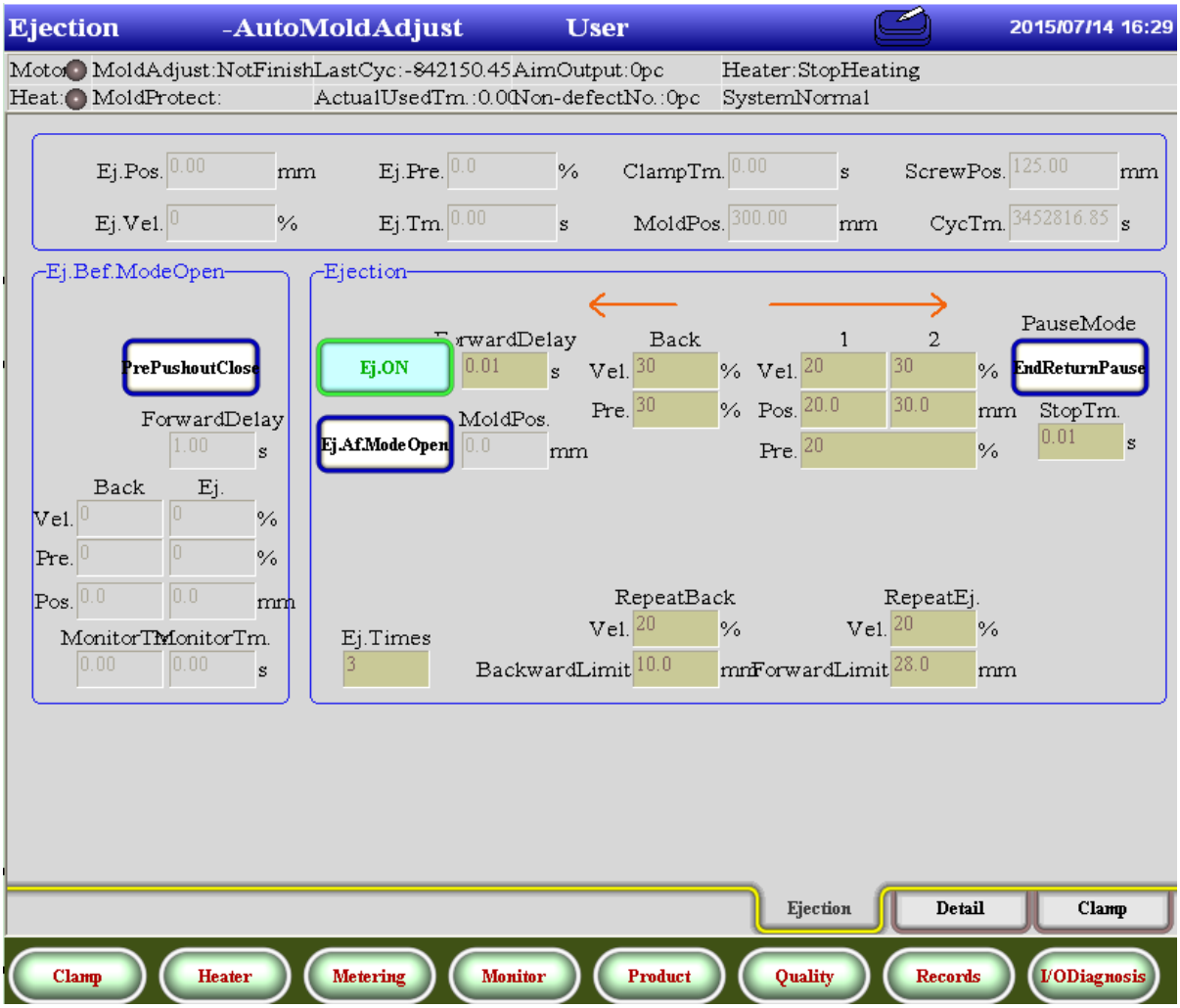
i. The ejector switch should be opened, refer to the following steps:

Step one: Enter the “Clamp” interface after pressing the

button.



Step two: Enter the “Ejection” interface after pressing button.



Step three: The button becomes

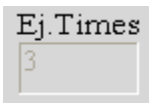
after pressing the

button. The

[EJECTOR-PIN FORWARD],

[EJECTOR-PIN BACKWARD] and

[MULTI-EJECTION] buttons can be operated, after the ejector operation is started. The ejector times of the **[MANUAL MULTI-EJECTION]** can be input the [Ej.Times] to the frame.



- The mold-opening should be performed with in-position, if it does not, the upper right corner of the interface may display the [Mold open not in position] when ejecting. It is better to perform the ejector operation again after pressing the

to adjust.

(3) The button operation of the mold opening/clamping:

[MOLD-OPENING] button: The corresponding indicator is ON after pressing this button, the moveable plate is performed the mold opening. Vice versa.

[MOLD-CLAMPING] button: The corresponding indicator is ON after pressing this button, the moveable plate is performed the mold clamping. Vice versa.

(4) The operation of the screw button

[PLASTIC-PUMPING] button: The corresponding indicator is ON after pressing this button, the screw is then retreated. Vice versa.

[INJECTION] button: The corresponding indicator is ON after pressing this button, the ejection operation is then performed. Vice versa.

[COLLOSOL] button: The corresponding indicator is ON after pressing this button; the collosol operation is then performed. Vice versa.

1. The preconditions before installing the screw:

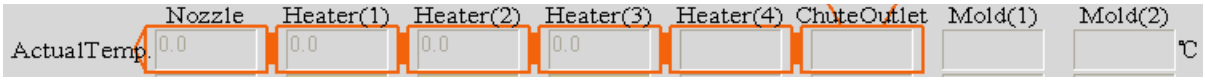
   The temperature of the cartridge heater should be reached to the upper/lower limit range of the object temperature, and the clod-start time arrives.

   Shift to the “Heater” interface after pressing the

button.

User can set the object temperature ([ObjectTemp.]), upper/lower temperature ([UpperLimitTemp.] / [LowerLimitTemp.]) and holding temperature ([HoldTemp.]) based on the actual requirement, the electric heater can be started pressing the

; the [HeaterState] frame display “Heating”. The [ActualTemp.] on the interface displays the actual temperature value of the cartridge heater.



When the current cartridge heater temperature reaches to the object one, the [HeaterState] displays [StopHeating].

(5) Button operation of the automatic material-cleaning

[AUTOMATIC MATERIAL-CLEANING] button: The corresponding indicator is ON, after pressing this button, the automatic material-cleaning is then performed.

Prompt

-

The enabled condition of **[AUTOMATIC MATERIAL-CLEANING]** button
  - The automatic material-cleaning is performed when disconnecting the material-cleaning protective switch, and it is necessary to retreat the ejection-seat to the limit situation;
  - The automatic material-cleaning is performed when connecting the material-cleaning protective switch, and the automatic material-cleaning can be normally performed regardless of retreating the ejection-seat to the limit alarm situation;
- Refer to the Section 4.3.3.2.3 Material-cleaning for details.

(6)

,

[CORE IN] are provided two core-in to control the mold and mold-core motion function. In the **[MANUAL]** working mode, the indicator is ON after controlling this button, and then perform the core-in operation; the indicator is OFF and stopped after releasing this button.

(7)

,

[CORE OUT] are provided two core-out to control the mold and mold-core motion function. In the **[MANUAL]** working mode, the indicator is ON after controlling this button, and then perform the core-out operation; the indicator is OFF and stopped after releasing this button.

(8)

[MANUAL BACK-PRESSURE] button does not use temporarily.

(9) Mold blowing key operation

[MOVABLE MOLD BLOWING] button: The indicator is ON in the **[MANUAL]** working mode after pressing this button, the movable plate blowing is then performed; the indicator is OFF and the operation is stopped after releasing.

[STATIONARY MOLD BLOWING] button: The indicator is ON in the **[MANUAL]** working mode after pressing this button, the stationary plate blowing is then performed; the indicator is OFF and the operation is stopped after releasing.

（10）

[TRIAL EJECTION] button does not use temporarily.

4.2.2.2.2 [MANUAL] Mode Operation Precaution

The mold clamping operation and ejector operation have relationships, which are shown below:

1) The

,

and

buttons are enabled, as long as the plate retreats to the mold-opening position after pressing the

.

2) The

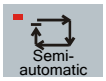
,

and

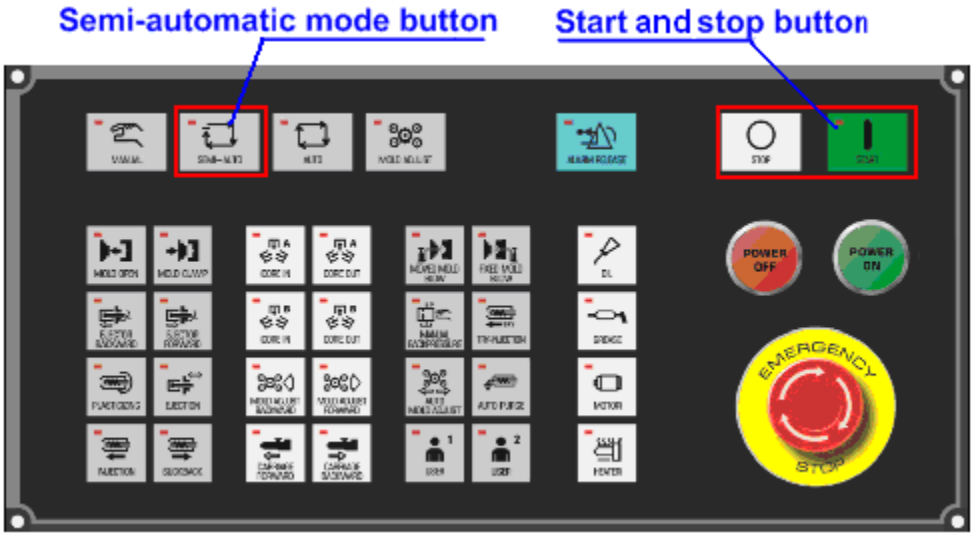
buttons are disabled when the mold-opening does not perform the in-position.

4.2.2.3 [SEMI-AUTOMATIC] Mode Operation

4.2.2.3.1 Usable Button of Operation Mode Shift ([SEMI-AUTOMATIC] Mode) and Auxiliary Operation Panel

Press the 

[SEMI-AUTOMATIC] button, the following button operation can be performed after the operation mode is set the **[SEMI-AUTOMATIC]** mode.

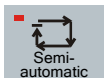


(1) **[START], [STOP]** button operation

[START] button: The corresponding indicator is ON after pressing this button, the injection molding machine is automatically performed a cycle operation, then automatically stop; the indicator is then OFF after stopping.

[STOP] button: The [Semi-automatic] operation is immediately stopped after pressing this button.

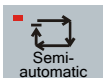
- Shift to the **[FULL-AUTOATIC]** mode by pressing the

button, during the **[SEMI-AUTOMATIC]** mode, and then it performs according to the **[FULL-AUTOATIC]** mode, actually, it enters the next working period and does not stop after performing one cycle operation. The normally stop in the **[FULL-AUTOATIC]** mode: firstly shift to the **[SEMI-AUTOMATIC]** mode pressing the 

button; and then the injection molding machine is automatically stopped after performing one cycle.
- In the **[SEMI-AUTOMATIC]** operation mode, shift to the [Manual] mode pressing the

[MANUAL] button, the motor is stopped after shifting. It is not recommended to shift this operation.
- The **[SEMI-AUTOMATIC]** operation is immediately stopped pressing the

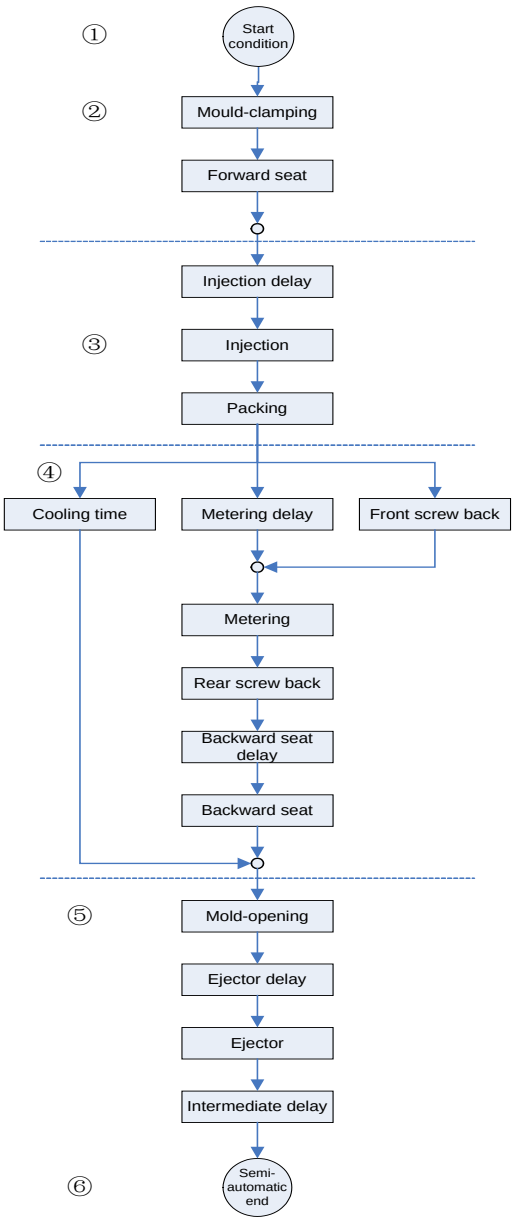
button, in this case, the [Manual] button should be controlled, then shift to the

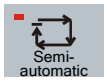
[MANUAL] mode performing the mold opening/clamping, ejector pin and metering in-position operations, and then press the 

[SEME-AUTOATIC] button, shift return to the **[SEMI-AUTOMATIC]** mode. The next working period is continued pressing the

button.
- The **[MOLD-ADJUSTMENT]** mode can not be shifted during the **[SEMI-AUTOMATIC]** mode operation.

4.2.2.3.2 Operation Schedule of [SEMI-AUTOMATIC] Mode



① Shift to the **[SEMI-AUTOMATIC]** mode by pressing the 

button, and it is operated by controlling the

button.

② The automatic clamping-close operation is started with the system;

③ The ejection operation starts after the clamping-close is performed.

④ The cooling time starts and then performs a collosol metering.

⑤ The cooling time ends and then starts a clamping-mold operation.

⑥ The ejector operation is performed after the mold-opening is performed with in-position. The intermediate timing performs after the completion of the ejector. The operation stops after the intermediate operation is stopped. After one cycle operation is performed, press the

button, the steps from ② to ⑥ should be repeated.

Notice

- If the safety door (front/back one) is opened during the operation of the **[SEMI-AUTOMATIC]** mode; the injection molding machines are immediately stopped whatever performs any step.

- The injection molding machine will be immediately stopped pressing the

in the **[SEMI-AUTOMATIC]** mode.

- If you want recovering the **[SEMI-AUTOMATIC]** operation, firstly close the safety door, then press the

[MANUAL] button shifting to the **[MANUAL]** mode, and then confirm the following operations:

  1) Check whether the mold-opening is performed the in-position, if it does not, the alarm prompt [Mold open not in position] at the upper right corner may occur; it is better to adjust pressing the

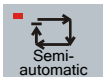
[MOLD-OPENING] key.

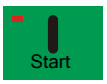
  2) Check whether the ejector pin is performed the in-position, if it does not, the alarm prompt [Ejector back not in position] at the upper right corner may occur; it is better to adjust pressing the

[EJECTOR RETREAT] key.

  3) Check whether the metering collosol is performed the in-position. If it does not, the alarm prompt of [Metering Plastisol not in position] may occur at the upper right corner; it is better to adjust it by pressing the

[COLLOSOL] key;

  4) The above-mentioned operations can be pressed the 

key after confirming without any alarm, and then press the 

button, the machine is then operated.

  5) If the alarm prompt generates at the previous 3 operations, the system then can not be start the **[SEMI-AUTOMATIC]** mode.

4.2.2.3.3 Semi-Automatic Subsidary Function

1. Semi-automatic front door start

In the mold-adjustment, enter the

page, and then open the

button, the system is then shown the function options. This function can be performed after opening the 7th bit

in the [Low16Bits] page.

Function explanation: If the mold-opening and metering are performed in the semi-automatic state, the safety door can be started the machine before closing regardless of the **[START]** button.

2. Safety door continues operate before the semi-automatic

In the mold-adjustment, enter the

page, and then open the

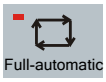
button, the system is then shown the function options. This function can be performed after opening the 9th bit in the [Low16Bits] page.

Function explanations:

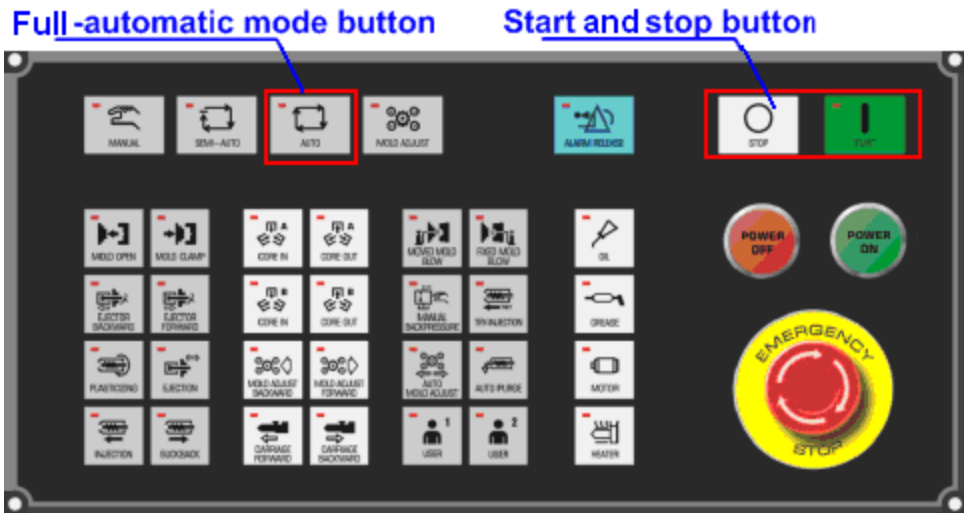
- Function close: Open the safety door in the semi-automatic process at any time, the operation then stops.
- Function open: Open the safety door before the completion of the injection packing, the operation then stops;
  Open the safety door after the completion of the injection packing, the operation then continues;

4.2.2.4 [Full-AUTOMATIC] Mode Operation

4.2.2.4.1 Button for Operation Mode Shift ([FULL-AUTOMATIC] Mode) and Auxiliary Operation Panel

Press the 

[FULL AUTOMATIC] button, the following buttons can be operated after the movement mode is set the “Full-automatic” mode.



(1) **[START], [STOP]** button operation

[START] button: The corresponding indicator is ON after pressing the button. The injection molding machine enters to the next working period after it performs one cycle operation; it does not to restart each time.

[STOP] button: The **[FULL-AUTOMATIC]** is being performed of which its operation speed is stopped.

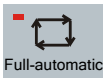
- The normal stop in the **[FULL AUTOMATIC]** mode, the

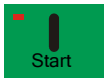
[SEMI-AUTOMATIC] button should be controlled firstly, then shift to the **[SEMI-AUTOMATIC]** mode; the injection molding machine is automatically stopped after performing one cycle.
- The

[MANUAL] button can be controlled in the **[FULL-AUTOMATIC]** operation mode, shift to the **[MANUAL]** mode, and then stop at the current operation state after shifting, the motor is then stopped operate; it is not recommended to do that.

- Immediately stop the **[FULL-AUTOMATIC]** operation pressing the

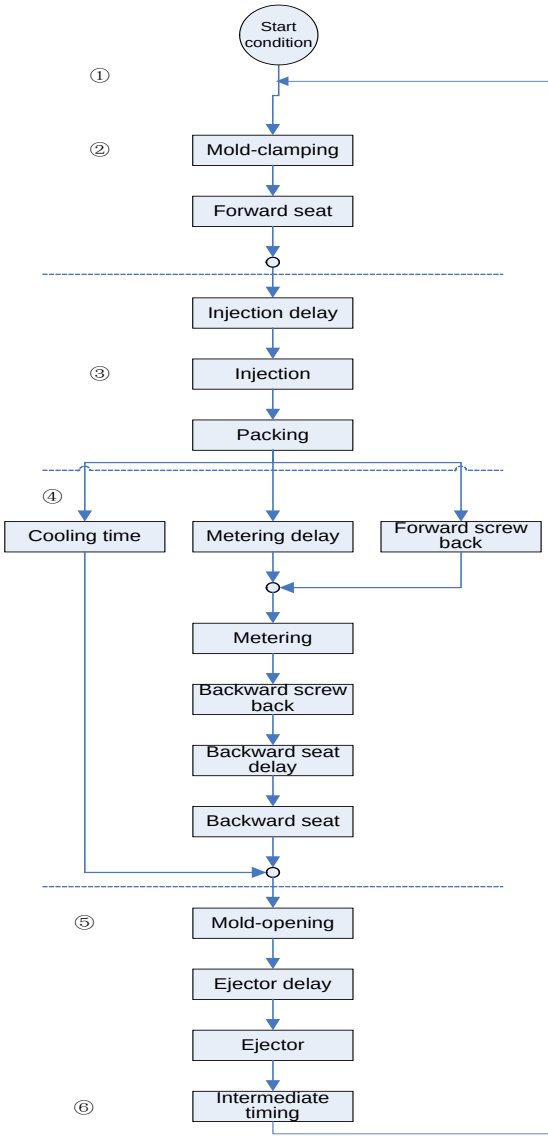
, in this case, the

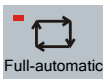
button should be performed, then shift to the [Manual] mode executing the mold opening/clamping, ejector, backward seat and metering operations, and then press the 

button; the next operation cycle can be continued pressing the 

button.
- The **[MOLD-ADJUSTMENT]** mode can not be shifted in the **[FULL-AUTOMATIC]** mode operation.

4.2.2.4.2 [Full-automatic] Mode Operation Schematic



① Shift to the **[FULL-AUTOMATIC]** mode pressing the 

[FULL-AUTOMATIC] button; the **[FULL-AUTOMATIC]** mode is operated controlling the

button.

② The system begins the automatic mold-clamping operation;

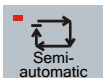
③ The ejection operation begins after the mold-clamping is completed.

④ The collosol metering is performed when the timing of the cooling time is started.

⑤ The mold-opening is performed when the time of the cooling time is ended.

⑥ The mold-clamping is started after the ejection operation is completed, the next cycle of the automatic operation is continued (the operations from the step ③ to ⑥).

Notice

- The machine is normally stopped in the **[FULL-AUTOMATIC]** mode, shift to the **[SEMI-AUTOMATIC]** mode pressing the 

[SEMI-AUTOMATIC] button firstly; the injection molding machine is automatically stopped after finish one cycle operation.
- If the safety door (front/back) is opened in the **[FULL-AUTOMATIC]** mode, the injection molding machine will be immediately stopped regardless of any operation.
- The injection molding machine may immediately stop pressing the

[STOP] button during the **[FULL-AUTOMATIC]** mode operation.
- Firstly, close the safety door to recover the [Full-automatic] operation, then shift to the **[MANUAL]** mode by pressing the

[MANUAL] button, and then confirm the following operations:

  1) Check whether the mold-opening is performed the in-position, if it does not, the [Mold open not in position] alarm prompt occurs on the upper right corner on the interface; adjust it by the

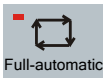
button.

  2) Check whether the ejector pin is performed the in-position, if it does not, the [Ejector back not in position] alarm prompt occurs at the upper right corner on the interface; adjust it by pressing the

button.

3) Check whether the metering collosol is performed the in-position, if it does not, the [Metering Plastisol not in position] alarm prompt may occur at the upper right corner on the interface; adjust it by pressing the

[COLLOSOL] button.

4) Confirming the above-mentioned operations are without any alarm, shift to the [Full-automatic] mode pressing the 

button, and then press the

button to operate.

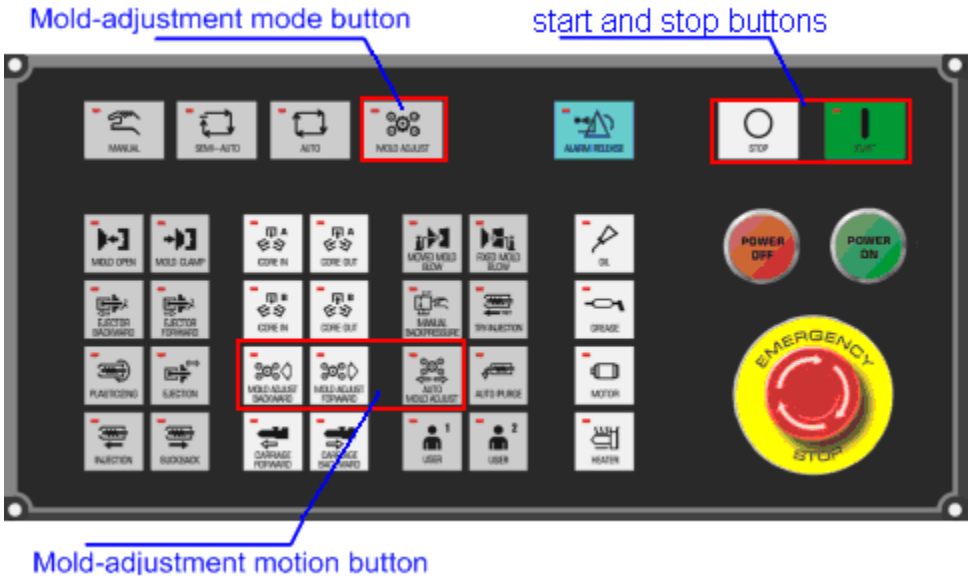
5) If the alarm prompt generates in the first 3 operations, the system will not perform the **[FULL-AUTOMATIC]** mode.

4.2.2.5 Mold-Adjustment Operation

Operation mode shift (Mold-adjustment mode)

Press the

[MOLD-ADJUSTMENT] button, the following buttons can be operated other than the one mentioned in the **[MANUAL]** mode, after the operation mode is set to **[MOLD-ADJUSTMENT]** mode.



(1) The button operation of the mold-adjustment：

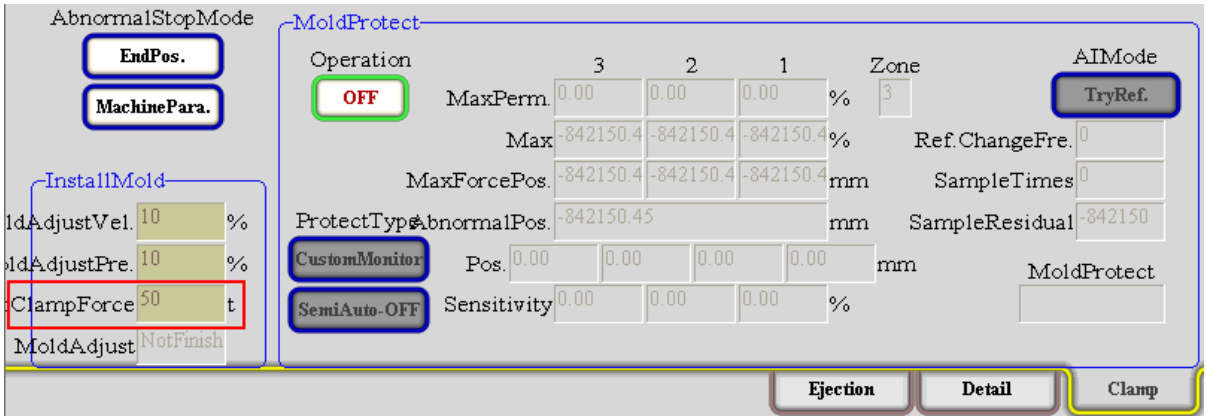
[MOLD-ADJUSTMENT ADVANCE] button: The corresponding indicator is ON pressing this button; the mold-clamping plate is forward. Vice versa. The button does not work in the Auto mold-adjustment.

[MOLD-ADJUSTMENT RETREAT] button: The corresponding indicator is ON pressing this button, the mold-clamping plate is backward. Vice versa. The button does not work in the Auto mold-adjustment.

(2) Automatic mold-adjustment

Calculate the clamping force based upon the product's projected area, then devided by 80, and then multiply by 100, the percentage of [ObjectClampForce] is then generated; the data can be set to the [ObjectClampForce] parameter.

For example: The calculated desired mold-clamping is 50T, 50÷80×100=62.5.



[AUTOMATIC MOLD-ADJUSTMENT] button: The corresponding indicator is ON during pressing the button, and then enters the [Automatic mold-adjustment] state.

Prompt

- The automatic mold-adjustment operation can be started by pressing the

[START] button after entering the **[AUTOMATIC MOLD-ADJUSTMENT]** state.
- When the automatic mold-adjustment operation is ended, the corresponding indicator of the

[AUTOMATIC MOLD-ADJUSTMENT] still ON; shift to the **[MANUAL]**, **[SEMI-AUTOMATIC]** and **[FULL-AUTOMATIC]** modes, the corresponding indicator of the

[AUTOMATIC MOLD-ADJUSTMENT] button may be turned off.

(3) **[START]** and **[STOP]** button:

[START] button: The corresponding indicator is ON after pressing this button, and then the automatic mold-adjustment operation is started. The corresponding indicator is OFF after the automatic mold-adjustment operation is completed.

[STOP] button: That the mold-adjustment operation is being performed is immediately stopped after controlling this button.

- The movement both the motor and machine are entirely moved along with the button operation by user in the mold-adjustment mode. And therefore, when the motor is operated in the mode-adjustment mode, ensure observing whether the movement axis is inside the range of the machine selection, otherwise, the machine and motor may be damaged.

4.2.3 Button Operation of Automatic Material-cleaning

When changing the plastic or the material is needed to be cleared, the following steps should be operated:

Step one: shift into [Manual] mode pressing the

button.

Step two: The injection molding equipment can be performed the material-cleaning operation, which retreats to limit alarm position, after controlling the

[INJECTION UNIT BACKWARD] button when the material-cleaning protective switch does not connect. This step can be skipped when the material-cleaning protective switch is connected.

Step three: The screw revolving speed is set to about 10rpm.

Step four: The automatic material-cleaning begins pressing the

[AUTOMATIC MATERIAL-CLEANING] button; the material-cleaning can be repeated based upon the times of the setting. The material-cleaning should be stopped before finishing the setting times, which is immediately stopped after pressing the

[AUTOMATIC MATERIAL-CLEANING] button again.

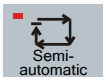
Step five: The abnormity noise and vibration are forbidden during the rotation of the screw.

Step six: Gradually enhance the rotation speed after the screw begins retreating.

- When the screw surface do not covered by the melted plastic, the screw component may be damaged if the screw is rotated with high speed.
- When the screw and cartridge components are change into the new one, in order to guarantee the running-in of the parts, it is better to perform the material-cleaning more than 20 times with 50rpm before molding.
- In order to protect the screw, it is better to rotate the screw with low speed till the plastic flows from the front terminal of the nozzle.
- Refer to the Section 4.3.3.2.3 Material-cleaning Operation for details.

4.2.4 Confirmation/Stop Operation of Injection Molding Machine End

4.2.4.1 Stop of Full-automatic Operation

Firstly, press the 

[SEMI-AUTOMATIC] button shifting to the **[SEMI-AUTOMATIC]** mode in the normal stop in the **[FULL-AUTOMATIC]** mode. The injection molding machine is automatically stopped after finishing one cycle.

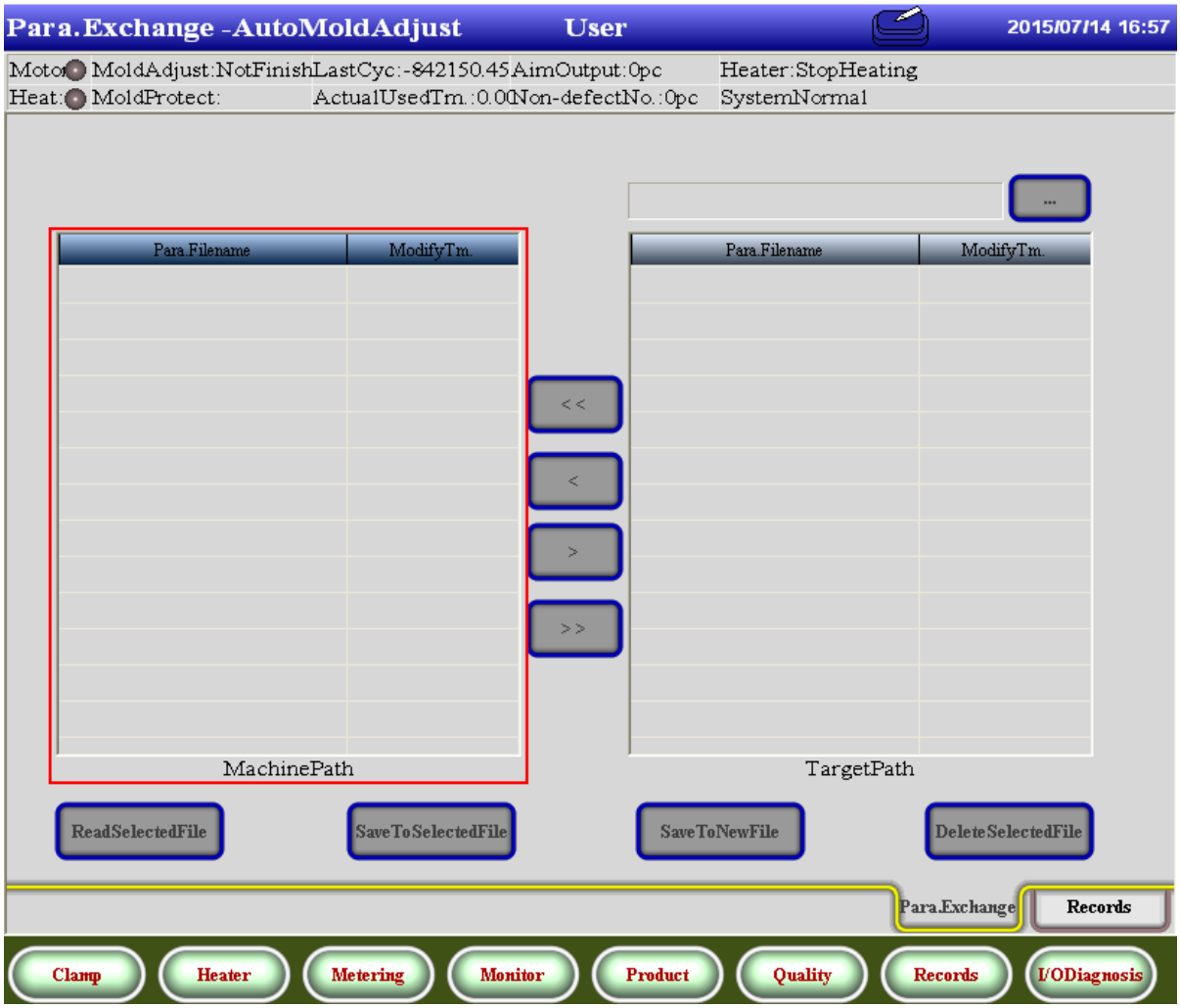
4.2.4.2 Save of Molding Condition

The molding condition save can be divided into two methods: machine and U-disk.

4.2.4.2.1 Machine Save

Save the parameter file to this machine, it is very convenient to call out the parameter data to produce from it.

Enter to the [Para.Exchange] interface:

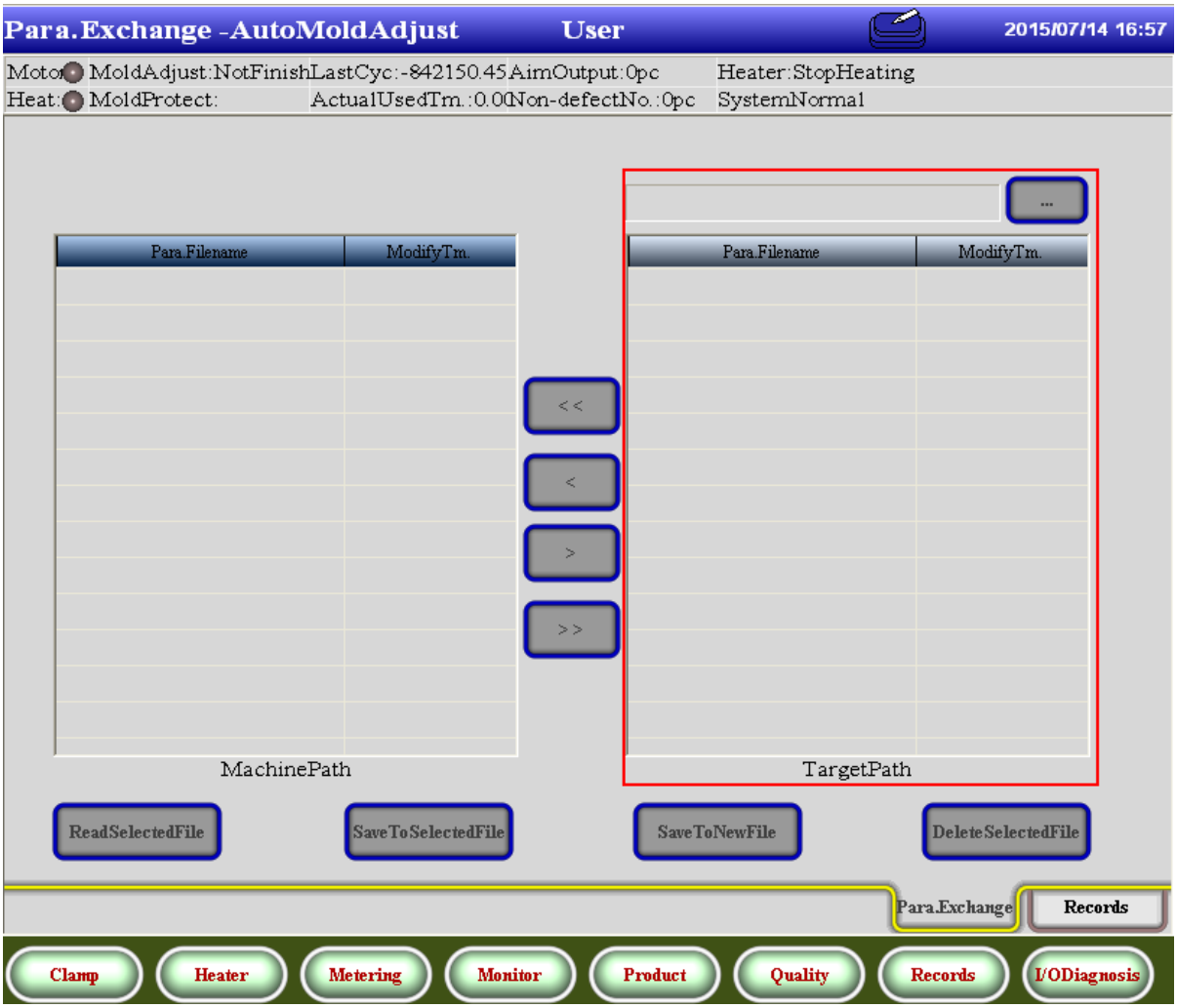


Click the red frame at the left of the window to enable it, in this case, the title of the window becomes dark blue, the save operation of this machine can be performed; refer to the Section 4.4.7 for details.

4.2.4.2.2 U-disk Save

Save the parameter to the U-disk, it is very convenient to copy the parameter data to use in the GSK6000 Series Injection Molding Machine Control System. And then enter to the [Para.Exchange] interface:

Click the right window of the interface to enable it, in this case, the title of the window becomes dark blue, the save operation of this machine can be performed; refer to the Section 4.4.7 for details.



4.2.4.3 Electric Heat Power Cut-off

Step one: Shift to the **[MANUAL]** mode controlling the

[MANUAL] button;

Step two: The corresponding indicator is OFF by pressing the

[ELECTRIC HEAT] button, and then cut the electric heat power.

4.2.4.4 Mold Detection

Step one: Close the safety door, then press the

[MANUAL] button, and then shift to the **[MANUAL]** mode;

Step two: The mold-opening is operated after pressing the

[MOLD-OPENING] button;

Step three: Control the

[MOTOR] button, and then cut the motor off;

Step four: Clean the mold after opening the safety door, paint the antirust grease on the mold surface based upon the requirements;

Step five: Close the safety door, then press the

[MOTOR] button, and then switch the motor on; in order to protect the system, the other motion buttons can be operated after waiting for 6 seconds.

Step six: Press the

[MOLD-CLAMP] button to perform the mold-clamping.

4.2.4.5 Cut off the Motor's Power

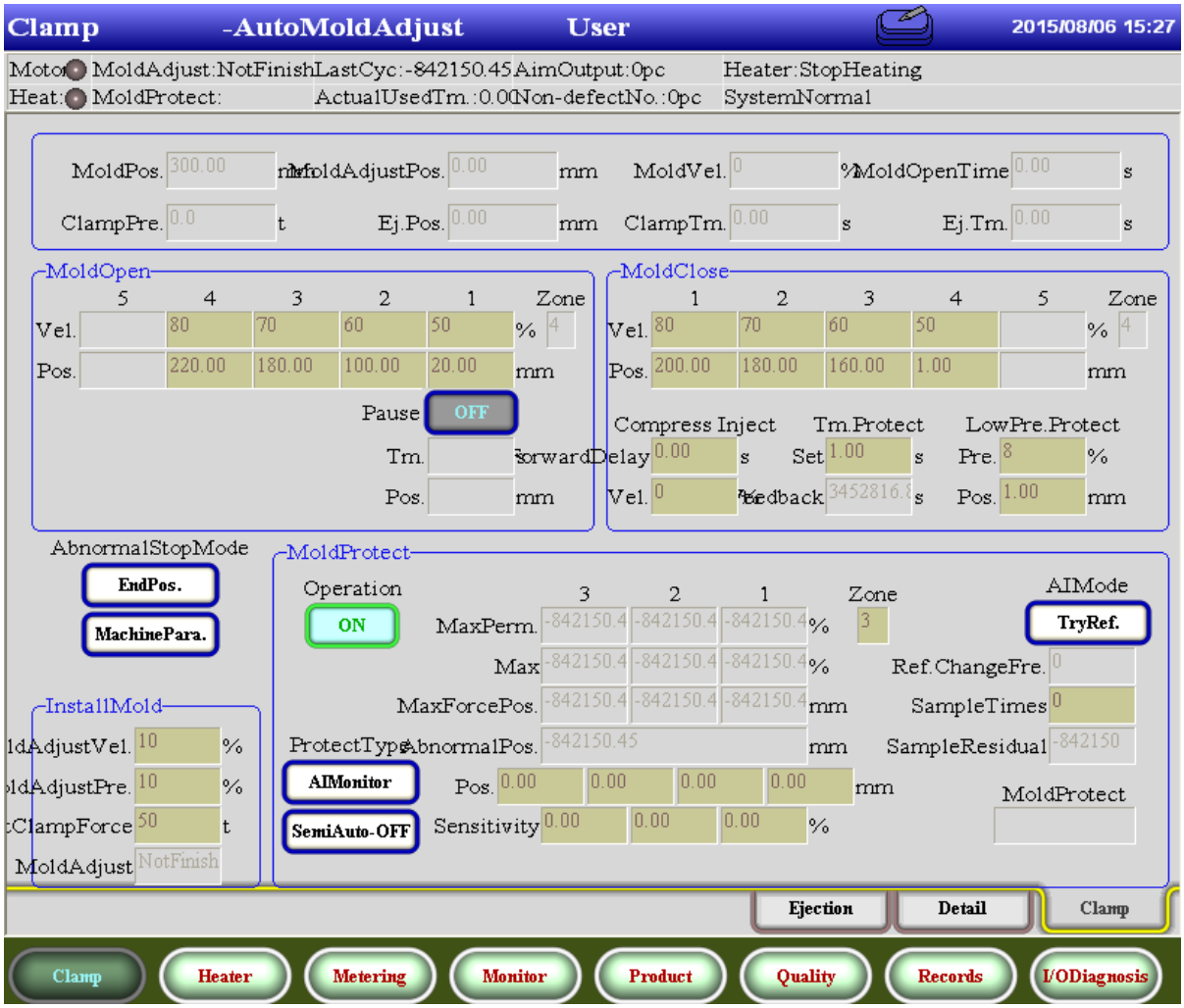
Step one: Confirm the injection molding machine may not generate some trouble in the stop state.

Step two: the corresponding indicator is OFF pressing the

button, and then cut the motor's power off.

4.3 Parameter/Function Setting

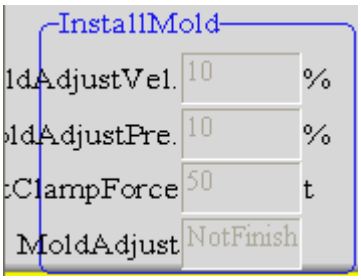
4.3.1 Mold Opening/Clamping



4.3.1.1 Page of [Clamp]

The time, pressure, speed and position parameter of the mold opening/clamping are set on this page.

4.3.1.1.1 Mold Installation



This system is simple and shortcut in installing the mold. After the 3 parameters, for example, the [MoldAdjustVel.] (The speed is that mold-adjustment touches the mold), [MoldAdjustPre.] (The force is that mold-adjustment touches the mold) and the

[ObjectClampForce] (Set the desired clamping force based upon the projective area of the mold cavity) are installed, the system is then automatically completed the mold-adjustment after pressing the [start] button in the mold-adjustment mode.

Generally, the mold-clamping speed default value is 10%

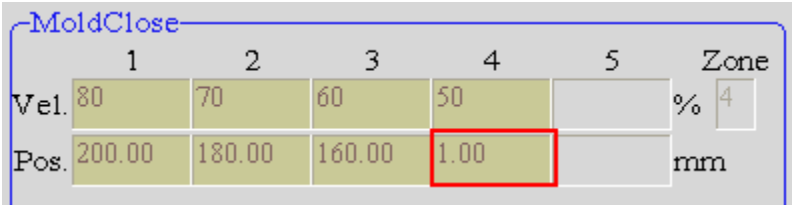
Usually, the mold-clamping pressure default value is 10%

Ordinarily, the mold-opening speed default value is 10%

For the related parameter, the mold thickness can be altered based upon its requirements.

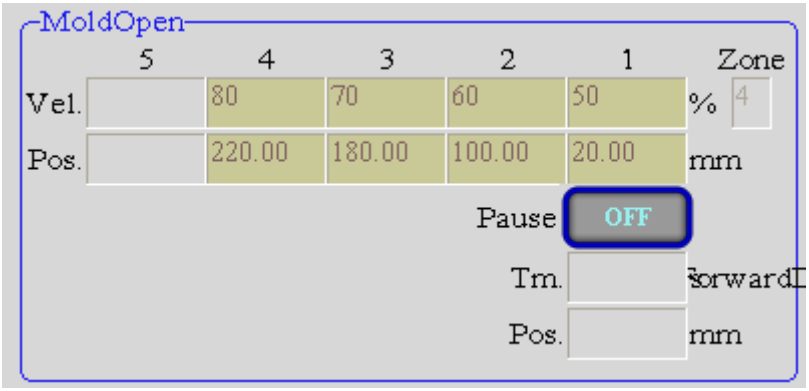
Notice

1. If the automatic mold-adjustment does not use, the thickness setting of the mold is wrong, the correct mold-clamping will not be performed.
2. When changing the mold thickness and [HighPre.] mold-clamping pressure, as well the mold thickness equipment is adjusted manually, it is better to install the mold using the automatic mold-adjustment.



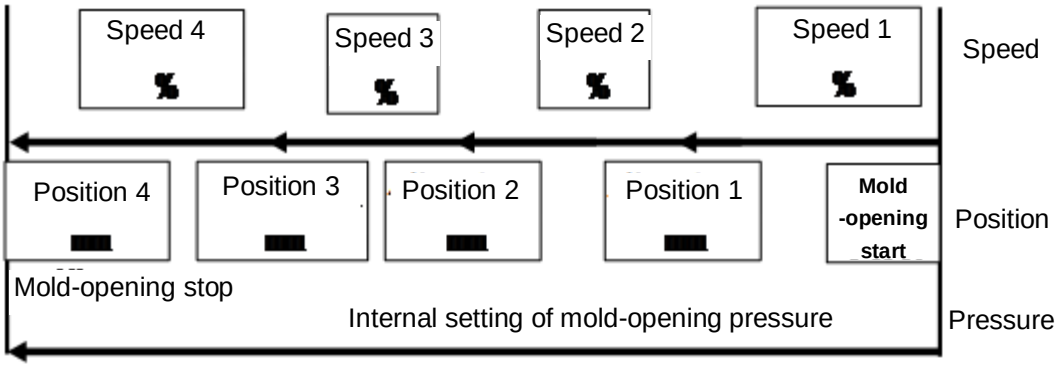
3. The system may automatically set the high pressure start position after the automatic mold-adjustment is completed; if the mold-clamping can not be carried out, it is better to add 0.05mm for its actual value based upon the mold position.
4. It is necessary to adjust again for the automatic mold thickness after the mold heats up stably.

4.3.1.1.2 Mold-Opening



The mold-opening divides into 4 section changes, **[SPEED 1]** is the initial period of the mold-opening, **[SPEED 2]** and **[SPEED 3]** are the high speed of the mold-opening intermediate position and the **[SPEED 4]** is the slow stage for the mold-opening.

The **[SPEED 1]** passes **[POSITION 1]** and shifts to **[SPEED 2]**, the **[SPEED 2]** passes **[POSITION 2]** and shifts **[SPEED 3]**, the **[SPEED 3]** passes **[POSITION 3]** and shifts to **[SPEED 4]**; the **[SPEED 4]** is the stop position. Usually, in order to shorten the period time, the **[POSITION 4] should** be set within 5mm.



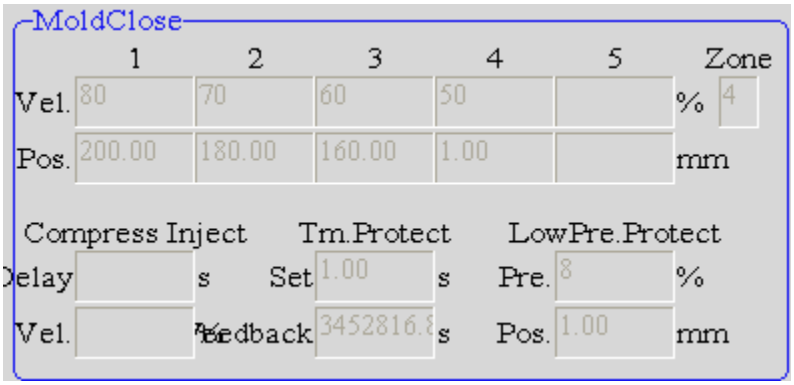
The setting of mold-opening at each shift position should be set by the following relationships:

Speed setting range: 0～100%, it is better to set from slow to fast based upon the requirement, but it should be abode by the mold-opening flow: Slow-Fast-Slow.

Position setting range: 0～300, it is better to set by ascending counts.

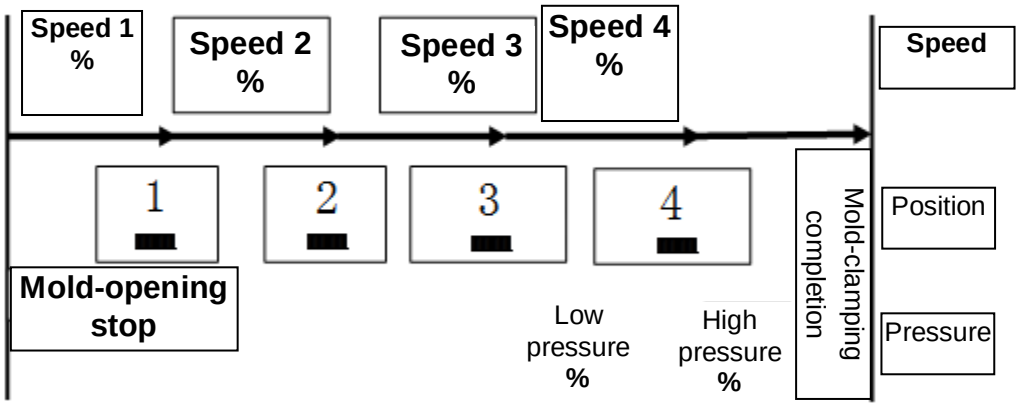
[POSITION 4] > **[POSITION 3]** > **[POSITION 2]** > **[POSITION 1]**

4.3.1.1.3 [MoldClose]



1. The mold-clamping divides into 4 section changes, **[SPEED 1]** is the initial period of the mold-clamping, **[SPEED 2]** and **[SPEED 3]** are the high speed of the mold-clamping intermediate position and the **[SPEED 4]** is the slow stage for the mold-clamping.

The **[SPEED 1]** passes **[POSITION 1]** and shifts to **[SPEED 2]**, the **[SPEED 2]** passes **[POSITION 2]** and shifts **[SPEED 3]**, the **[SPEED 3]** passes **[POSITION 3]** and shifts to **[SPEED 4]**; the **[SPEED 4]** is the position for high pressure.



3. [Tm.Protect]: The alarm may generate if the high pressure mold-clamping does not complete within the setting time, it is better to set this reasonably.

4. [LowPre.Protect]: In close to the completion of the mold-clamping, and set a section of the position to clamp the mold with the low mold-clamping force. The mold-clamping may stop if the mold-clamping still does not complete when its related pressure is reached, the alarm is then generated for protecting.

The setting of each shift position should be set by the following relationships:

Speed setting range: 0～100%, it is better to set from slow to fast based upon the requirement, but it should be abode by the mold-clamping flow, such as the Fast-Slow-Fast-Slow (Start the intermediate low speed). It is recommended that the low-pressure 4-speed position setting adds 5～20mm again of the figure thickness is the best based upon the mold-opening direction.

Position setting range: 0～300, it is set based upon the requirement.

Low pressure setting rang: 0～100%, it is set from Low to High based upon the requirement. The lower of protecting the mold is, the higher of the safety is, which is based on the requirement of the mold.

High pressure setting range is 50%～100%; the automatic mold-adjustment is performed after the parameter is set, and then the corresponding mold-forcing can be performed.

5. Compressive Injection: In the common injection cycle procedure, the injection starts after the mold-clamping is ended. The injection can be performed during the mold-clamping process by using the compressive injection function.

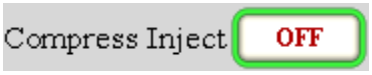
Compressive injection advantage: Shorten the period time, improve filling ability, reduce the injection pressure and enhance the product quality.

Compressive injection usage: When the mold-clamping position reaches to the 4th section position (High pressure mold-clamping position) of the mold-clamping, the mold-clamping motion stops; in this case, the system compares the dimension delay before injection and mold-clamping. The injection begins when the delay before the injection is less than the one

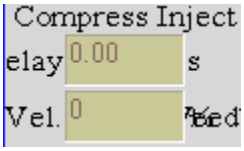
before the mold-clamping, till the delay time before the mold-clamping is ended, it will be continue to perform the mold-clamping to 0. So that, control whether the injection and mold-clamping are operated at the same time, alternatively, the 2nd mold-clamping is performed after the injection is executed. The exhaust can be performed by this function to reduce the injection pressure.

Note: ① The delay before injection should be used together when opening this function.

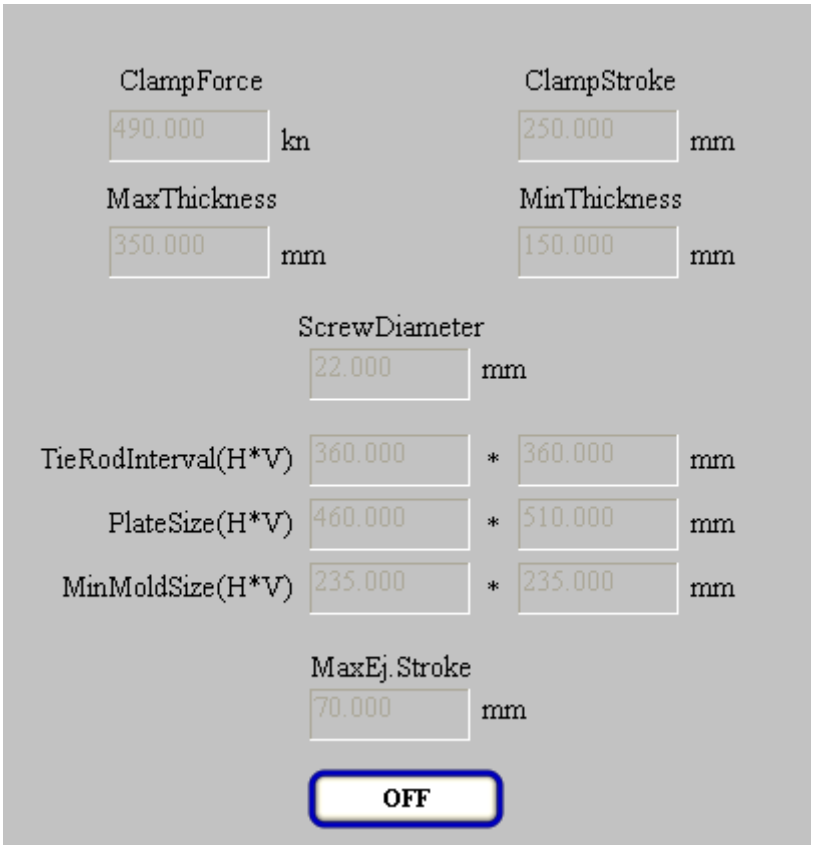
② The setting value of delay time before clamping should be less than the Injection time + Holding time.

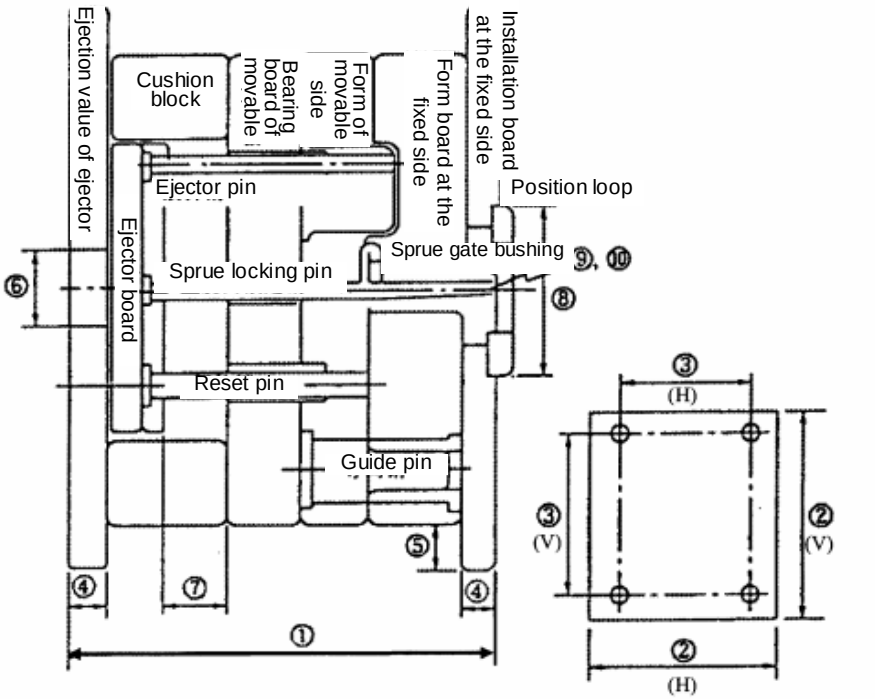
When 

is [ON] on the [Metering] page, the parameter setting edit frame under the compress injection is enabled.



The machine specification window displays after clicking the [MachinePara.] button. The parameter on this page is set according to the actual machine type.

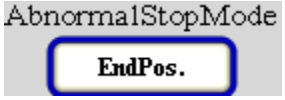


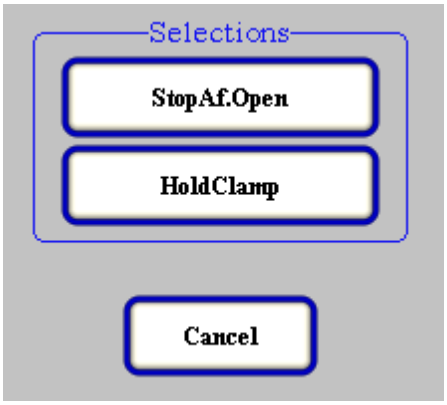


① Mold thickness
② Installation width (H*V)
③ Installation aperture interval (H*V)
④ Installation plate thickness (fixed side, movable side)
⑤ Installation plate height
⑥ The ejector of installation plate uses the aperture diameter/numbers
⑦ Ejection value of ejector
⑧ Positioning loop diamater
⑨ Sprue gate bushing R
⑩ Sprue gate diameter

4.3.1.1.4 Mold Protection

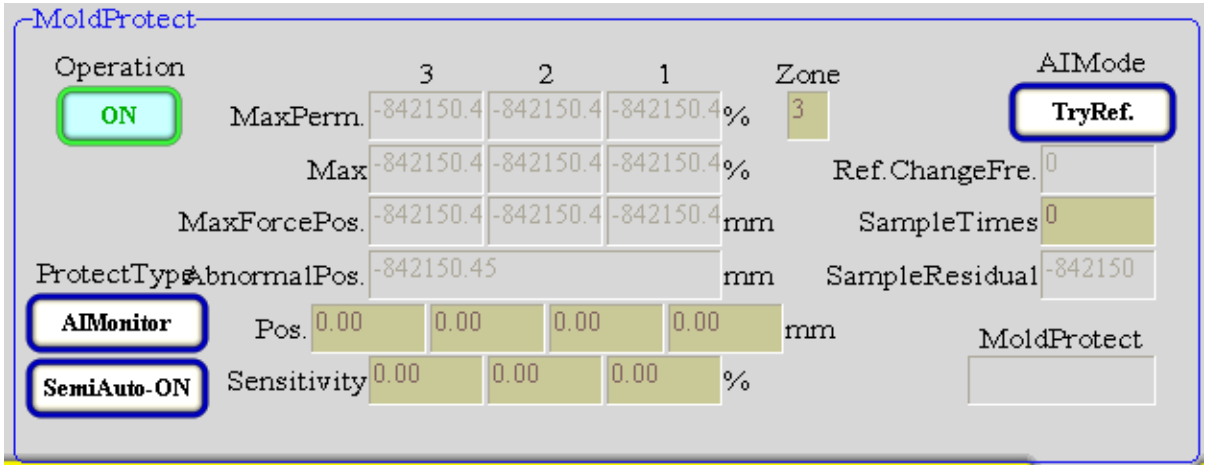
The troubleshooting methods for mold protection procedure when the abnormality occurs: **[StipAf.Open]** and **[HoldClamp]**; refer to the following figure:





4.3.1.1.5 Mold Protection Setting

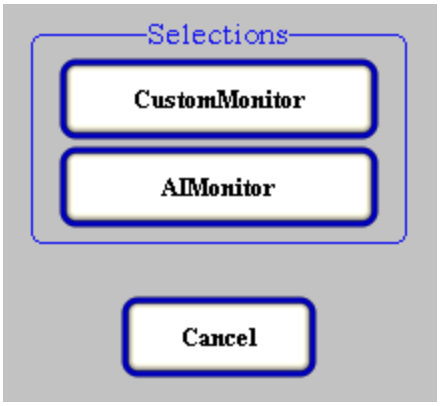
Click the **[Operation]** button to open the protective operation, refer to the following figure:



Two buttons under the [ProtectType] can be enabled.

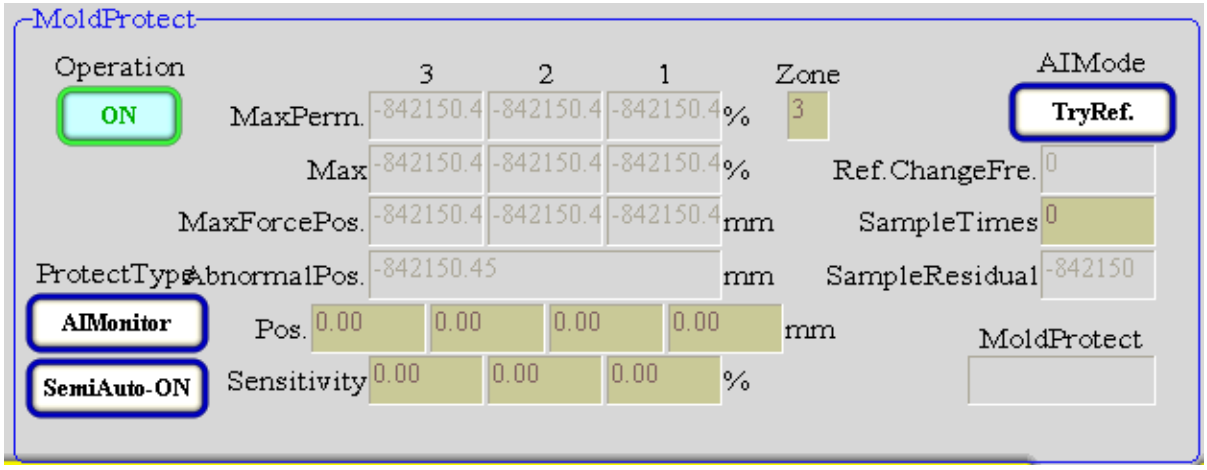
4.3.1.1.5.1 Mold Protection Setting 1

Click the 1st button under the [ProtectType] , the following selection figure is then shown:



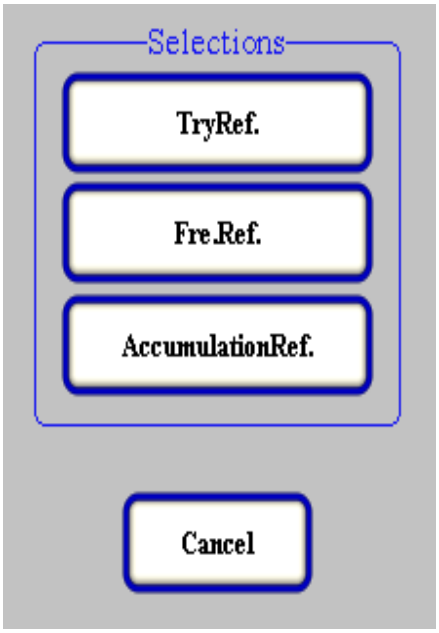
4.3.1.1.5.1.1 Intelligent Monitoring ([AIMonitor])

[MAXPerm.] editing frame is disabled when it becomes grey, but the **[AIMode]** button and [**Pos.**] editing frame are enabled; refer to the following figure:



The setting range of the **[Pos.]** is between the **[LowPre.Protect]** and **[MoldColse 4]**. (Refer to the [**MoldClose**] in the page of **[Clamp]** for the **[LowPre.Protect], [MoldColse 4].**

[Sensitivity]: Input a percentage based upon the requirement.



The selection figure, as the left one, will be shown by clicking the button under the **[AIMode]**.

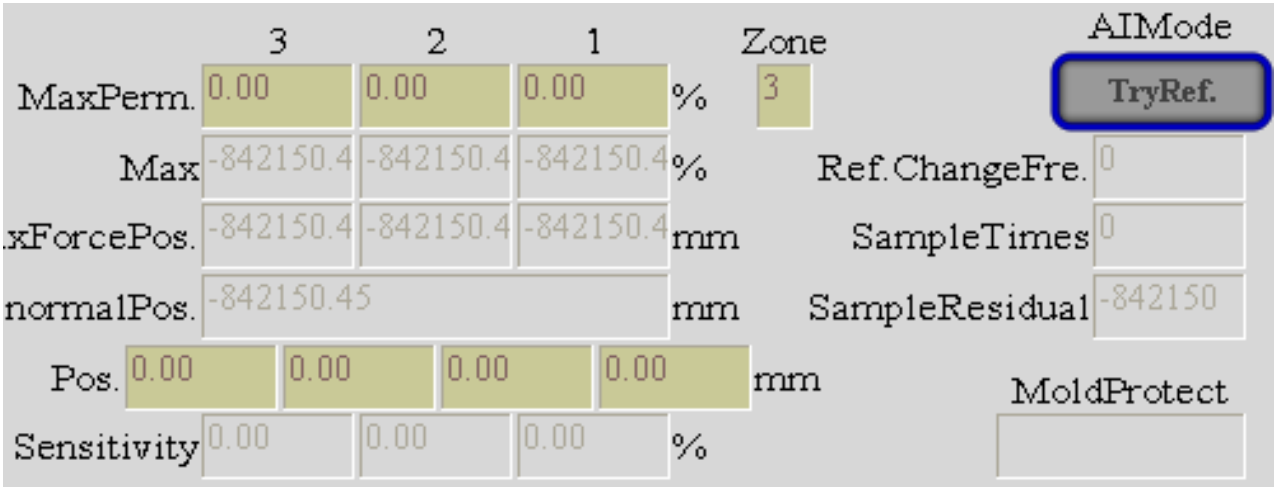
Wherein, there are 3 modes can be selected:

1. Selecting the **[TryRef.]**, **[SampleTimes]** edit frame is enabled.
2. Selecting the **[Fre.Ref.]**, **[Ref.ChangeFre.]** and **[SampleTimes]** edit frames are enabled.
3. Selecting the **[AccumulationRef.], [SampleTimes]** edit frame is enabled.

The **[Max]**, **[MaxForcePos.]** and **[AbnormalPos.]** can not be modified, which is shown the related state value at the current operation mode.

4.3.1.1.5.1.2 [CustomMonitor]

The **[MaxPerm.]** and **[Pos.]** edit frames are enabled, the button of **[AIMode]** is disabled when it becomes grey; refer to the following figure:

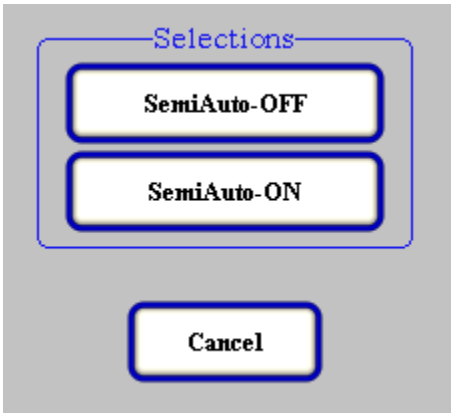


The setting range of **[POSITION]** is indentical with the **Intelligent Monitoring ([AIMonitor]).**

The **[Max]** is the loading percentage when the movable platen passes its corresponding position during detecting the mold-clamping.

Refer to the display value of the **[Max]** of the **[MaxPerm.]**, slightly adjust it.

4.3.1.1.5.2 Mold Protection Setting 2



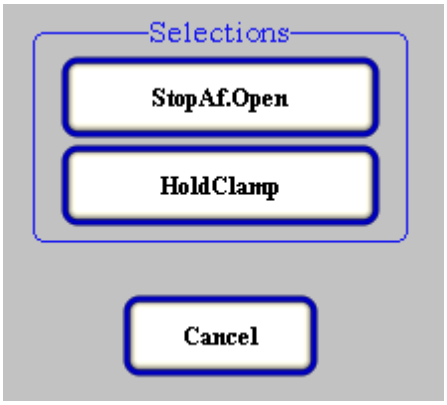
Clock the 2nd button under the **[ProtectType]**, the following selection figure is then shown:

Whether opens the mold protection in the semi-automatic mode.

Select its corresponding working mode.

4.3.1.1.5.3 Mold Protection Setting 3

Click the button under the **[AbnormalStopMode]**, the following figure will show:

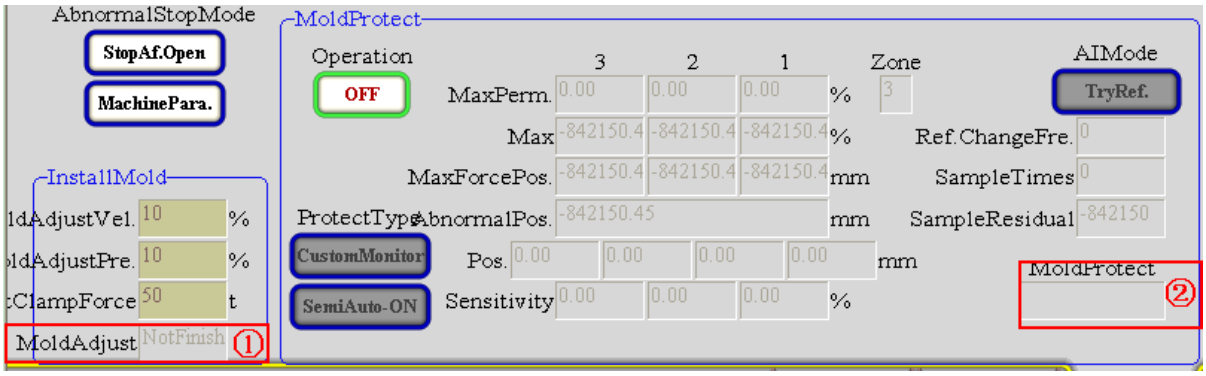


There are two options when the fault alarm occurs:

1. **[StopAf.Open]:** It is stopped after the mold-opening.
2. **[HoldClamp]:** Mold-clamping state reservation.

Select the corresponding treatment method.

4.3.1.1.6 Relative Mold

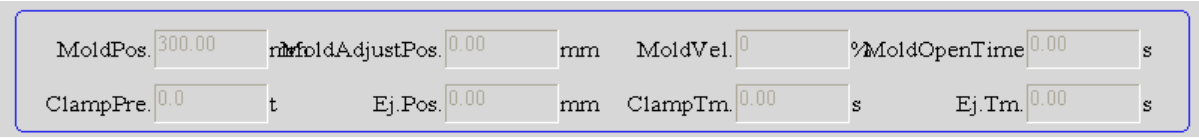


① Display the state of the mold automatic installation;

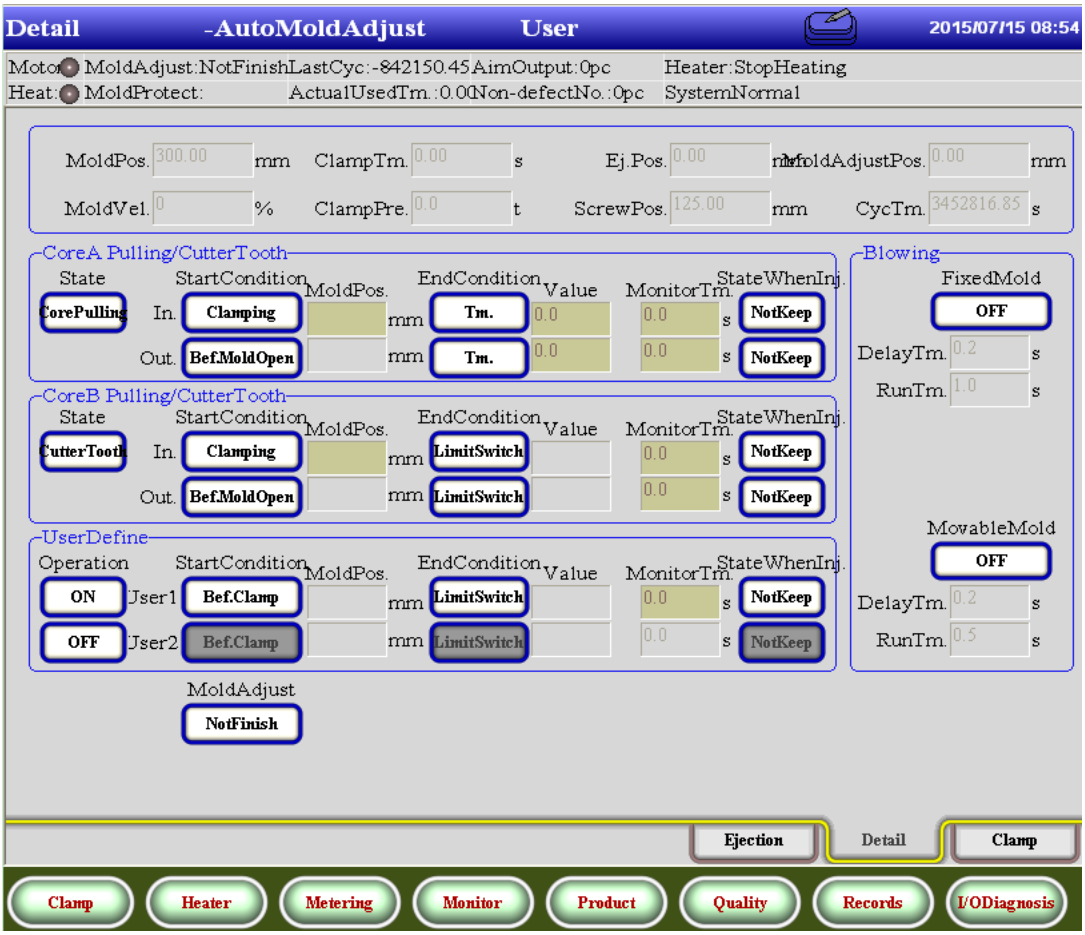
② Display the current mold protective state with real-time.

4.3.1.1.7 [Clamp] Page Monitoring Data

The monitoring area in this page is independent; components of each displayed unit can be freely selected based upon the requirements; refer to the Section 4.5.6 for the customization.

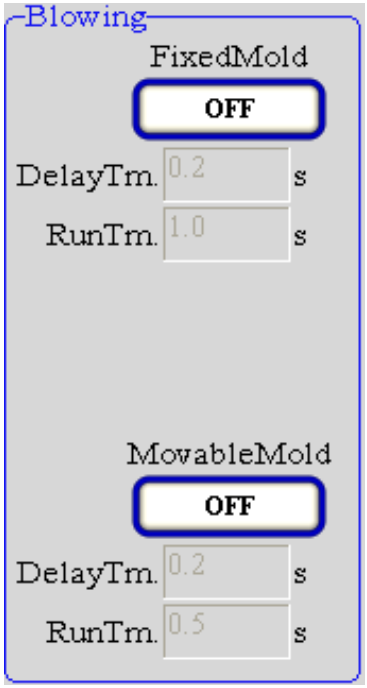


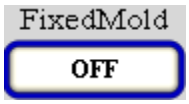
4.3.1.2 Detail of Mold Opening/Clamping

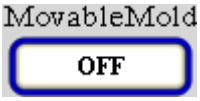


The **[Detail]** is responsible for setting the other miscellaneous steps during the mold opening/clamping.

4.3.1.2.1 Blowing Setting

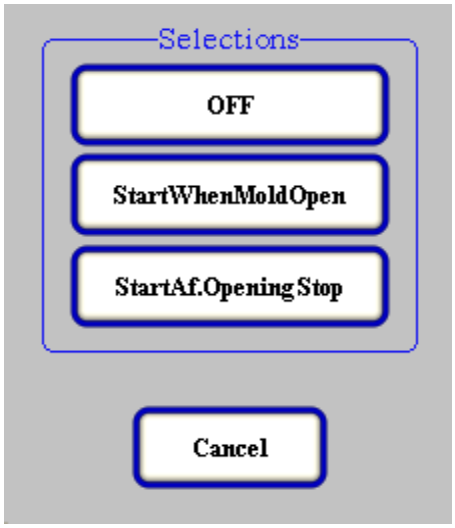


Click the blowing 

and 

buttons, its corresponding selection window can be then displayed.

There are 3 states for the blowing control at this column:



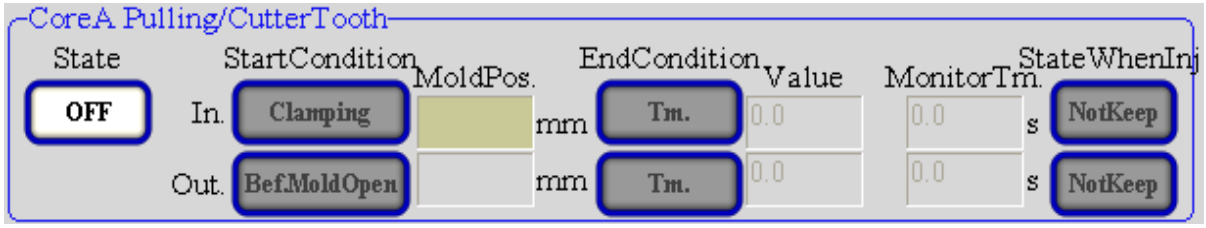
(1) **[Close]:** Do not use (Close)

(2) **[StartWhenMoldOpen]:** Start during mold-opening, The timing between the mold-opening and the beginning of the blowing operation is regarded as the **[DelayTm.]** (Delay time), and then time to the blowing machine operation; the time of the blowing operation is treated as the **[RunTm.]**.

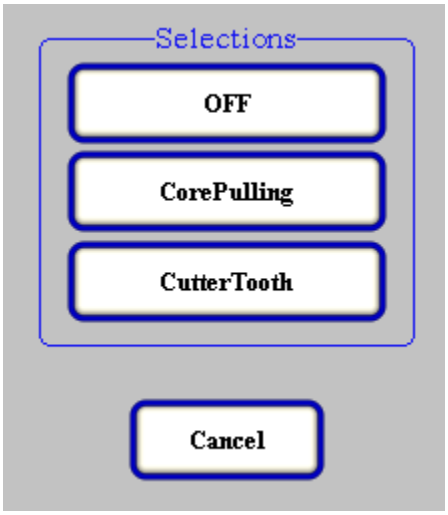
(3) **[StartAf.OpeningStop]:** Start it After Stopping the Mold-opening, The time between the mold-opening stop to the beginning of the blowing operation is regarded as **[DelayTm.]** (Delay time), the time of the blowing operation is treated as the **[RunTm.]**.

The range of the **[DelayTm.]** and **[RunTm.]**: it is set in terms of the actual requirement of the mold.

4.3.1.2.2 CoreA-Pulling Setting (Selective Purchasing Function)



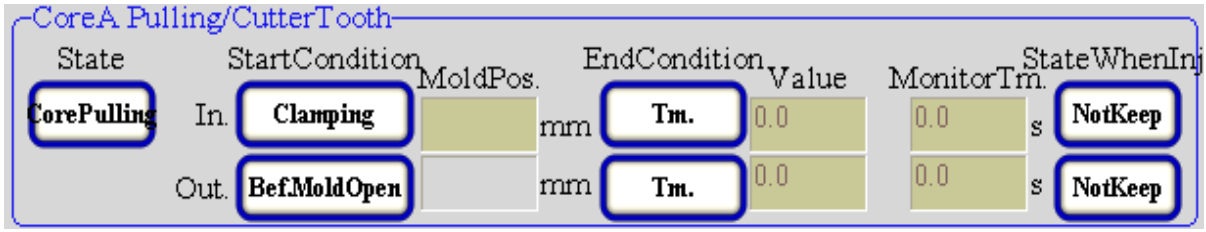
Click the **[State]** button, there are 3 methods can be selected: **[OFF]**, **[CorePulling]**, and **[CutterTooth]**.

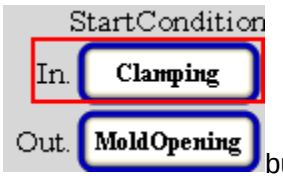


[CorePulling]: The end condition has the time and limit switch when the core-pumping is selected.

[CutterTooth]: The end condition has the time and limit switch and counting when selecting the height adjustment damper ([CutterTooth]).

When selecting the **[CorePulling]** or **[CutterTooth]** option, **[StartCondition], [EndCondition] and [StateWhenInj.]** buttons are enabled. Refer to the following figure:



Clock the 

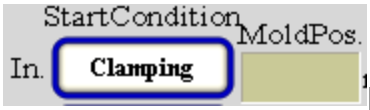
button, the following figure is shown: Wherein, there are 4 methods can be selected: **[Bef.Clamp], [Clamping], [Af.Clamp]** and **[EndClamp]**.

[Bef.Clamp]: Before mold-clamping. Only the core-in operation is performed, the mold-clamping then can be performed when the mold-clamping operation is prepared.

[Clamping]: During the mold-clamping. Start the core-in operation when the mold-clamping position reaches to the setting mold position, which can be operated with the mold-clamping together. The core-in operation should be completed before the high pressure occurs.

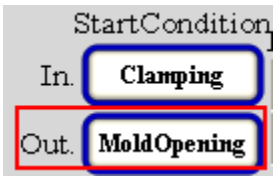
[Af.Clamp]: After mold-clamping. Mold position is 0, it is started to perform without high pressure.

[EndClamp]: Mold-clamping stop. Stop the mold-opening when the mold-clamping reaches to the set mold position; the mold-clamping motion can be continued after the core-in is performed.

When selecting the **[Clamping]** or **[EndClamp],** the edit frame under the 

[MoldPos.] is enabled

It is necessary to select the corresponding connection type based upon its requirements.

Click the 

button, the following selection figure is shown:

There are 4 methods can be selected: **[Bef.MoldOpen], [MoldOpening], [Af.MoldOpen]** and **[EndMoldOpen]**.

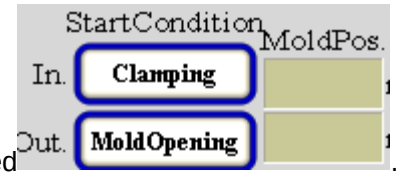
[Bef.MoldOpen]: Before mold-opening. The core-pumping should be performed before mold-clamping.

[MoldOpening]: During the mold-opening. Start the core-out motion when mold-opening position reaches to the set mold position, which can be operated with the mold-opening.

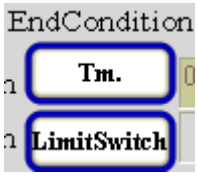
[Af.MoldOpen]: After mold-opening. Only the core-out can be performed after the end of the mold-opening.

[EndMoldOpen]: Mold-opening stop. Stop the mold-opening when the mold-opening sets to the mold position; the mold-opening can be continued after the core-out is performed.

Select the corresponding connect type based upon its requirements.

When selecting the **[MoldOpening]** or **[EndMoldOpen]**, the edit frames under the [MoldPos] are enabled 

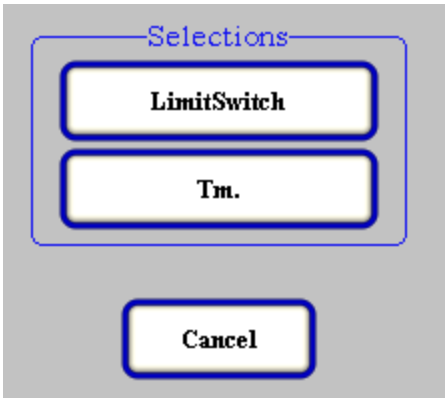
.

Click 

button, the following figure is then shown:

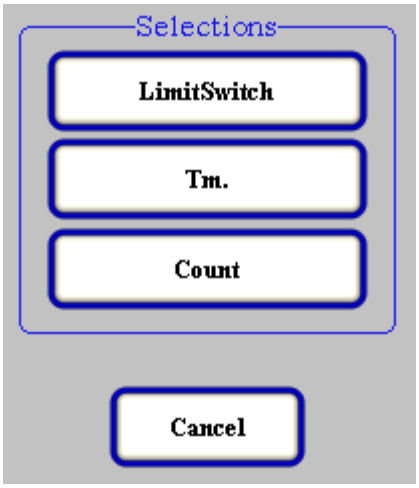
When

button selects the **[CorePulling],** 2 options are shown: **[Tm.]** and **[LimitSwitch]**.

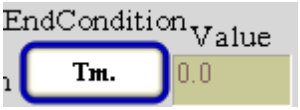


When the

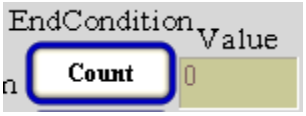
button selects the **[CutterTooth]**, 3 options are shown: **[Tm.]**, [**LimitSwitch**] and [**Count**].



1. **[LimitSwitch]**: Input the X input point of IO by connecting PLC, (Refer to the PLC wiring table for details); complete the current operation based upon the limit switch state.

2. **[Tm.]**: When 

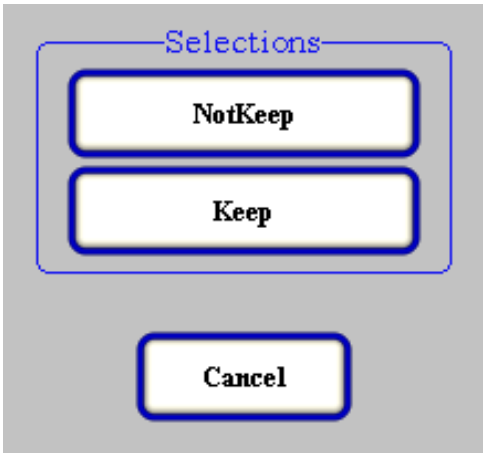
selects the time, the input frame at the right of the button is enabled, input the desired time value (Unit: second). Timing is performed when the operation is started; the current operation is ended when the time arrives to the condition value.

3. **[Count]**: When 

selects the counting, the input frame at the right of the button is enabled, input the desired counting value. Counting is performed when the operation is started; the current operation is ended when the counting arrives to the condition value.

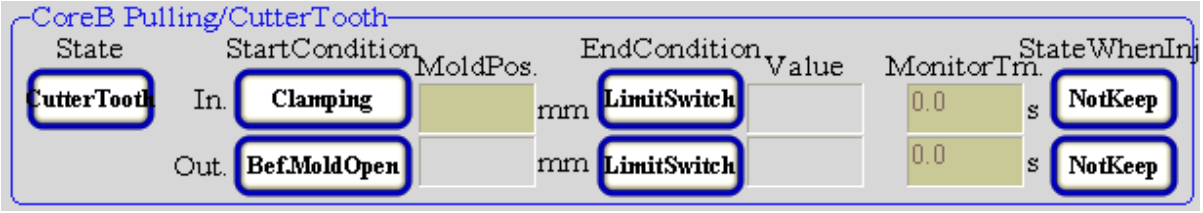
It is necessary to select the corresponding connection type based upon its requirements.

Click the **[StateWhenInj.]** button, the following figure is then shown:



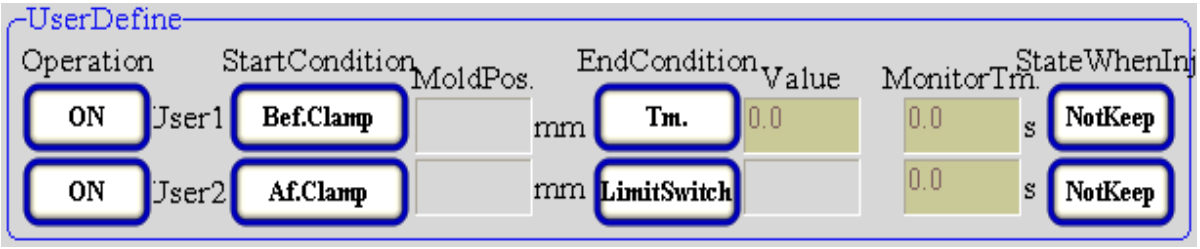
Wherein, there are 2 options: **[NotKeep]** and **[Keep]**.

Select whether the state is required during the injection based upon its requirements.



CoreB-pulling operation is identical with the coreA-pulling.

4.3.1.2.3 User Definition

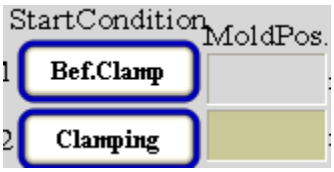


Click the [Operation] button, [ON] and [OFF] are shown. When the [ON] is selected; [StartCondition], [EndCondition] and [StateWhenInj.] are enabled.

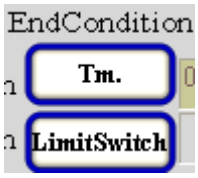
The following selection menu may occur by clicking the button under the [StartCondition]. Wherein, there are 8 options:

1. Before the mold-clamping ([Bef.Clamp]): The operation is started before the mold-clamping.
2. During the mold-clamping ([Clamping]): Start this operation when it reaches to the set mold position during the mold-clamping, which can be linked with the mold-clamping together.
3. After mold-clamping ([Af.Clamp]): The mold-clamping position is 0. Start this operation without high pressure.
4. Mold-clamping stop ([EndClamp]): During the mold-clamping, the mold-clamping continues after stopping the mold-clamping at the set mold position.
5. Before the mold-opening ([Bef.MoldOpen]): The mold-clamping position is 0, however, this operation is performed when the pressure-releasing is performed.
6. During the mold-opening ([MoldOpening]): This operation is started during the mold-opening procedure. The height adjustment damper function can be performed when the mold-opening position reaches to the set position.
7. After mold-opening [Af.MoldOpen]: This operation starts after the mold-opening ends.
8. Mold-opening stop ([EndMoldOpen]): During the mold-clamping, the mold-clamping continues after stopping the mold-clamping at the set mold position.

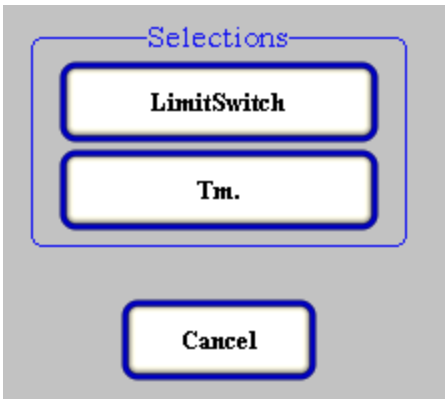
Select the corresponding connection type based upon its requirements. When selecting the [Clamping], [EndClamp], [MoldOpening] or [EndMoldOpen], the edit frame of



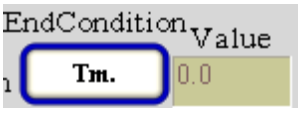
corresponding to the [MoldPos.] is enabled.

Click 

button, the following figure is then shown:



1. **[LimitSwitch]**: Input the X input point of IO by connecting PLC, (Refer to the PLC wiring table for details); complete the current operation based upon the limit switch state.

2. **[Tm.]**: When 

selects the time, the input frame at the right of the button is enabled, input the desired time value (Unit: second). Timing is performed when the operation is started; the current operation is ended when the time arrives to the condition value.

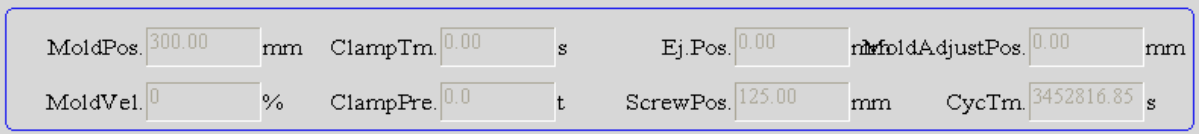
User 2 operation is identical with user 1.

4.3.1.2.4 PLC Wiring Table

	Core-in A	Core-out A	Core-in B	Core-out B	Self-defined IN	Self-defined IN counting	Self-defined OUT	Self-defined OUT counting
Input	X1.0	X1.1	X1.5	X1.6	X2.0	X2.2	X2.1	X2.3
Output	Y2.6	Y2.7	Y0.0	Y0.1	Y0.2		Y0.5	

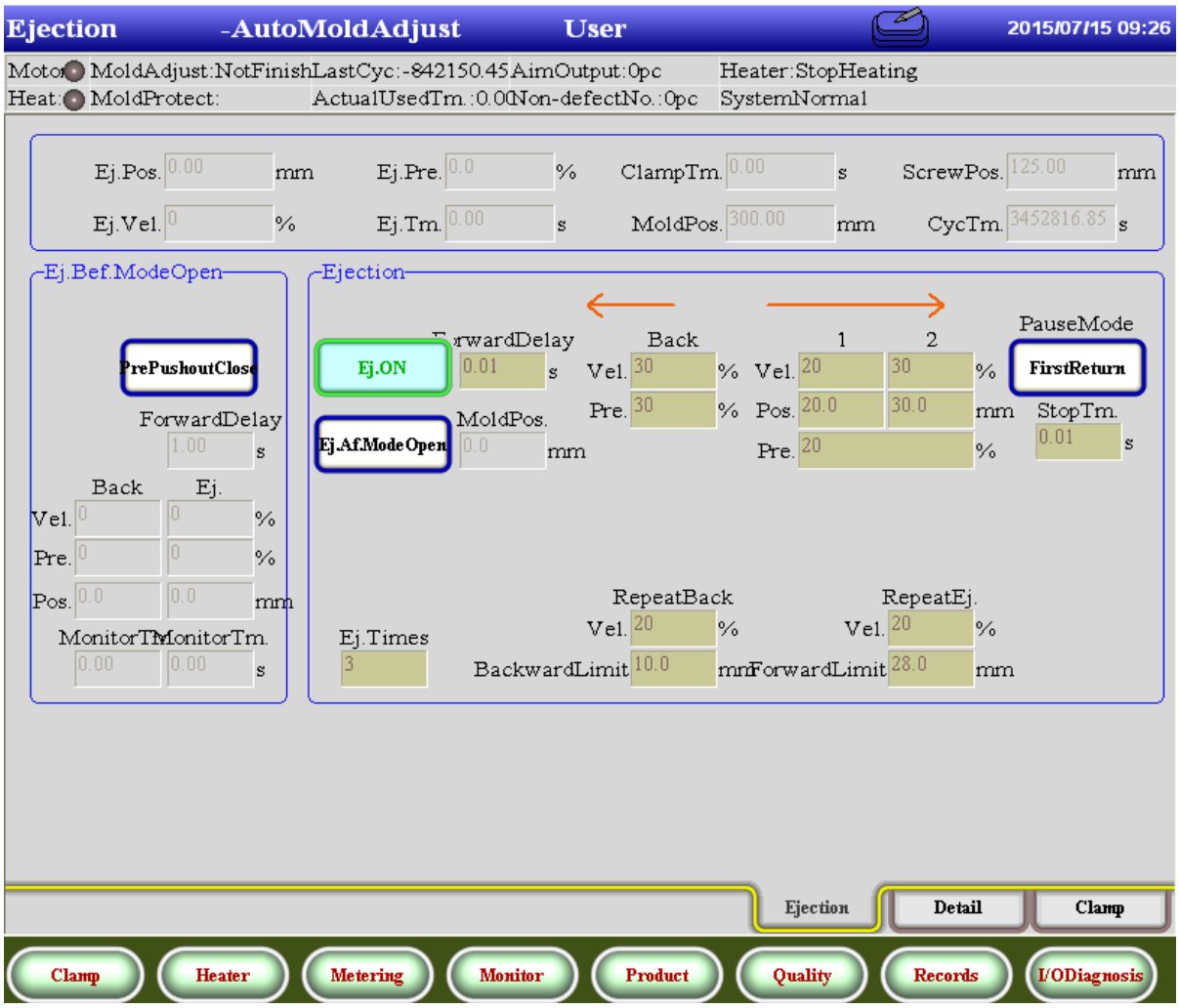
4.3.1.2.5 Monitoring Data of [Detail] Page

The monitoring area in this page is independent, each displayed unit can be freely selected based upon requirements, refer to the Section 4.5.6 for the page customization.



4.3.1.3 Ejection

This page is ejector setting page.



The setting range of the ejector pressure (**[Pre.]**): 0～100%

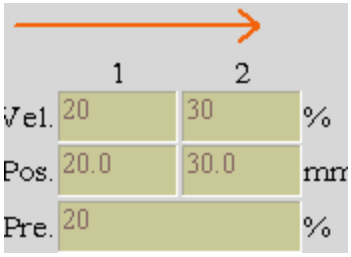
The setting range of the ejector speed (**[Vel.]**): 0～100%

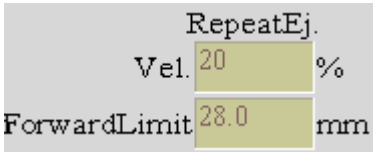
The setting range of the **[ForwardLimit]**: 0～75mm.

[StopTm.] and **[ForwardDelay]**: it is set based on the actual requirement.

4.3.1.3.1 Ejector Relative Setting

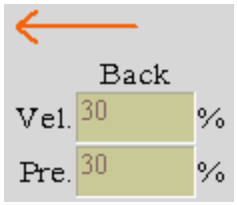
4.3.1.3.1.1 Ejector Forward Parameter Setting

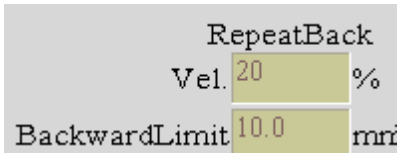




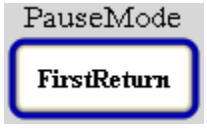
There are two speeds can be set during the ejector forward, which is shifted the speed based upon its position.

4.3.1.3.1.2 Ejector Retreat Parameter Setting



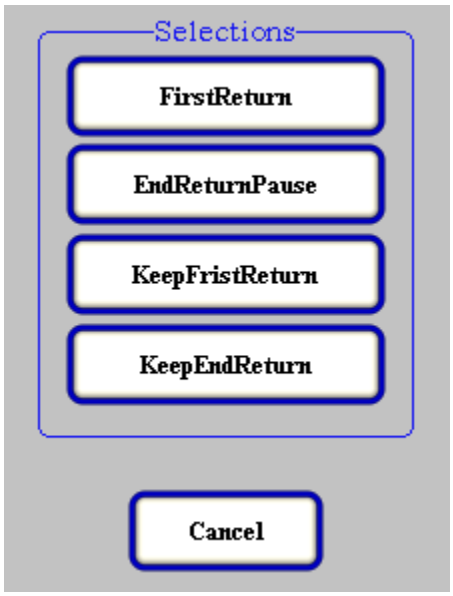


4.3.1.3.1.3 [PauseMode] Setting



: Click this button, the method selection window will show;

Ejector dwell setting, the state is **[FirstReturn], [EndReturnPause], [KeepFirstReturn]** and **[KeepEndReturn].**

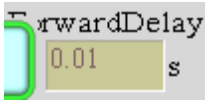


[FirstReturn]: performed at the 1st time of the ejector advance operation stop.

[EndReturnPause]: performed at the last ejector advance stop.

[KeepFirstReturn]: performed at the 1st ejector advance operation stop.

[KeepEndReturn]: performed at the last ejector advance stop.

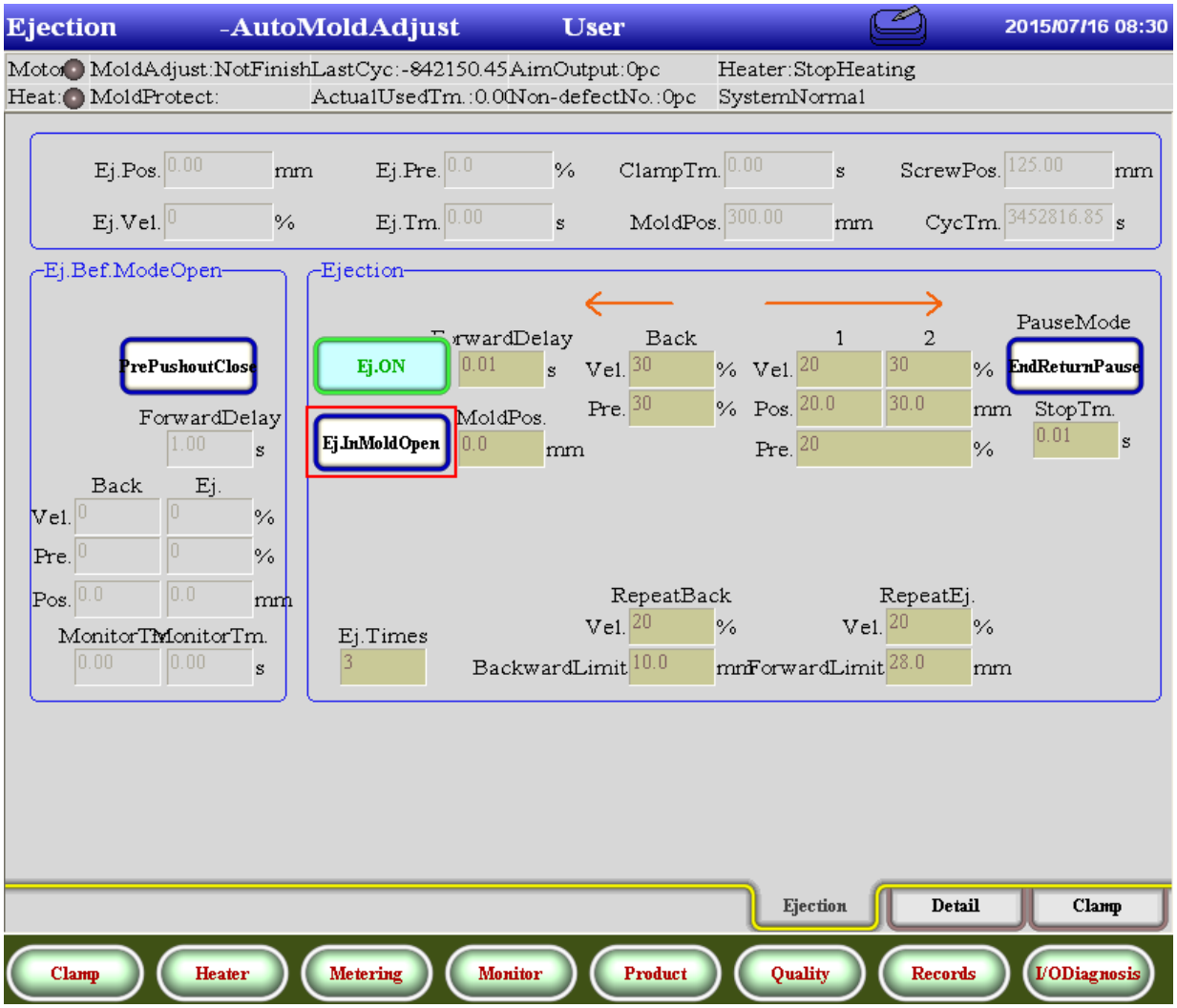


: set the delay time before ejector.

: Set the dwell time of the ejector advance stop position.

: The ejector times is enabled when the ejector is opened.

4.3.1.3.2 Other Functions



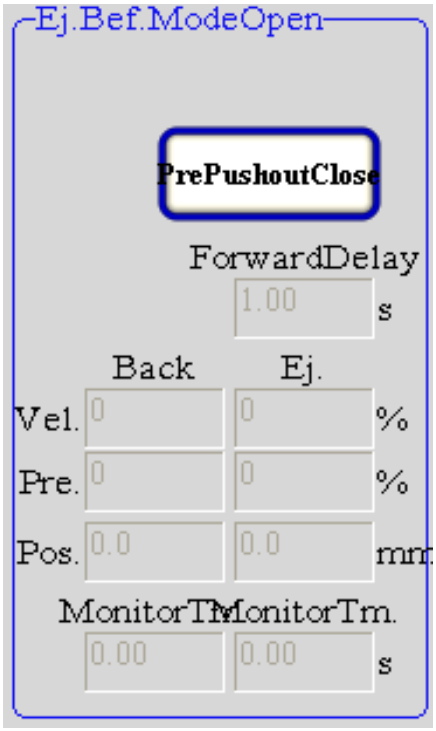
1. Ejection function in mold-opening (**[Ej.InMoldOpen]**);

The system may automatically open the corresponding **[MoldPos.]** frame when selecting the **[Ej.InMoldOpen]**. The ejector executes when movable plate start position arrives to the settting one.

The precautions of the **[MoldPos.]** and the length setting of the ejector.

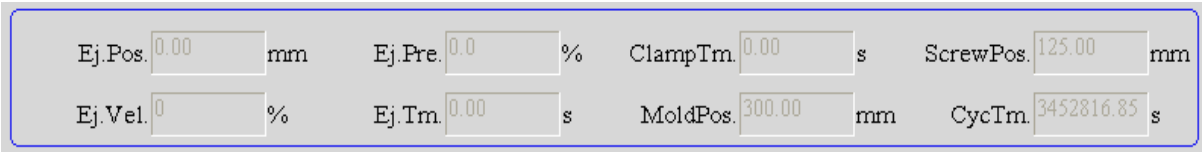
[MoldPos.] ＞ **[Ejection 2 Pos.]** and **[ForwardLimit]**

2.Pre-ejection function before mold-opening (**[Ej.Bef.ModeOpen]**);



This function does not perform yet.

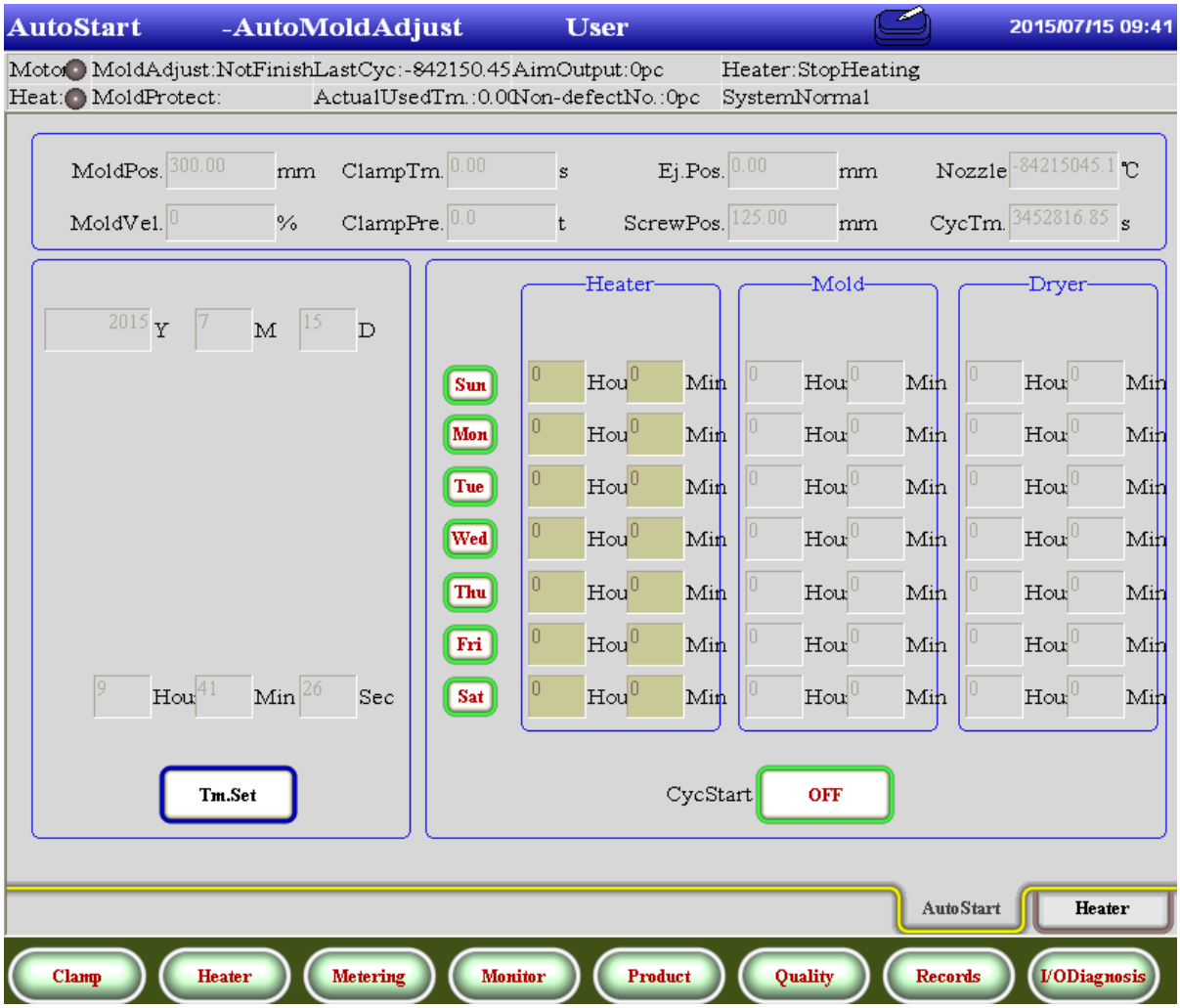
4.3.1.3.3 Monitoring Data of [Ejection] Page



The monitoring area in this page is independent; each display unit can be freely selected based upon the requirements; refer to the Section 4.5.6 page customization for details.

4.3.2 Temperature

4.3.2.1 Automatic Start



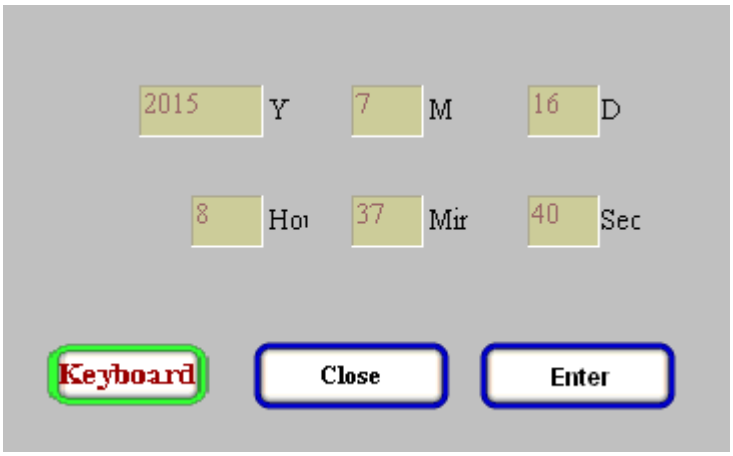
[AutoStart] interface displays and sets the date and time; as well the injection molding machine and the relevant equipment timing start setting.

4.3.2.1.1 Data Display and Setting

4.3.2.1.1.1 Modification Method:

The following window will be displayed by clicking the

button.



The Year, Month and Date can be set in the date input frame; click the

to confirm the modification, then the soft keyboard displays; the data modification can be performed after inputting the data and then control the

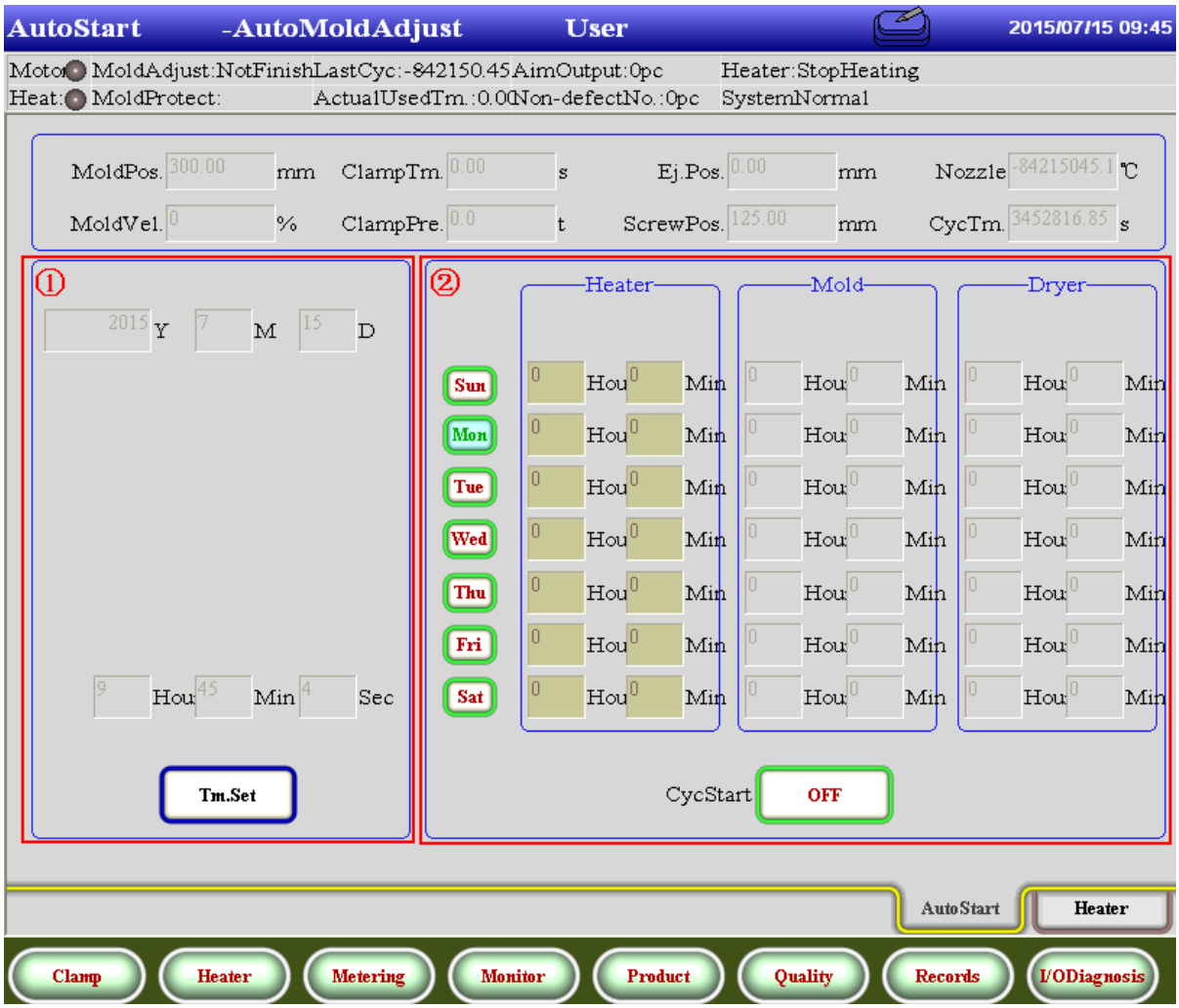
button.

The Hour, Minute and Second can be set in the date input frame; click the

to confirm the modification, then the soft keyboard displays; the data modification can be performed after inputting the time and then control the

button.

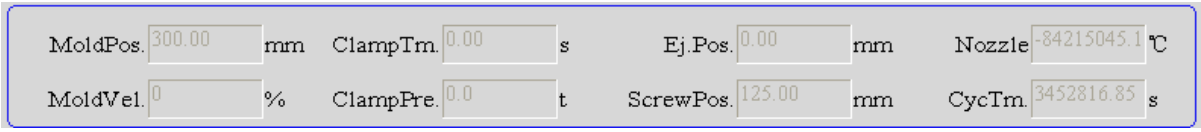
4.3.2.1.2 Timing Start Setting



① The time display and setting will be displayed in the frame;

② The week and the time will be set in the frame, the modification is immediately enabled while changes;

4.3.2.1.2.1 Monitoring Data of [AutoStart] Page



The monitoring area in this page is independent; each display unit can be freely selected based upon the requirements; refer to the Section 4.5.6 page customization for details.

4.3.2.2 Heating Part

4.3.2.2.1 Setting Principle of General Temperature

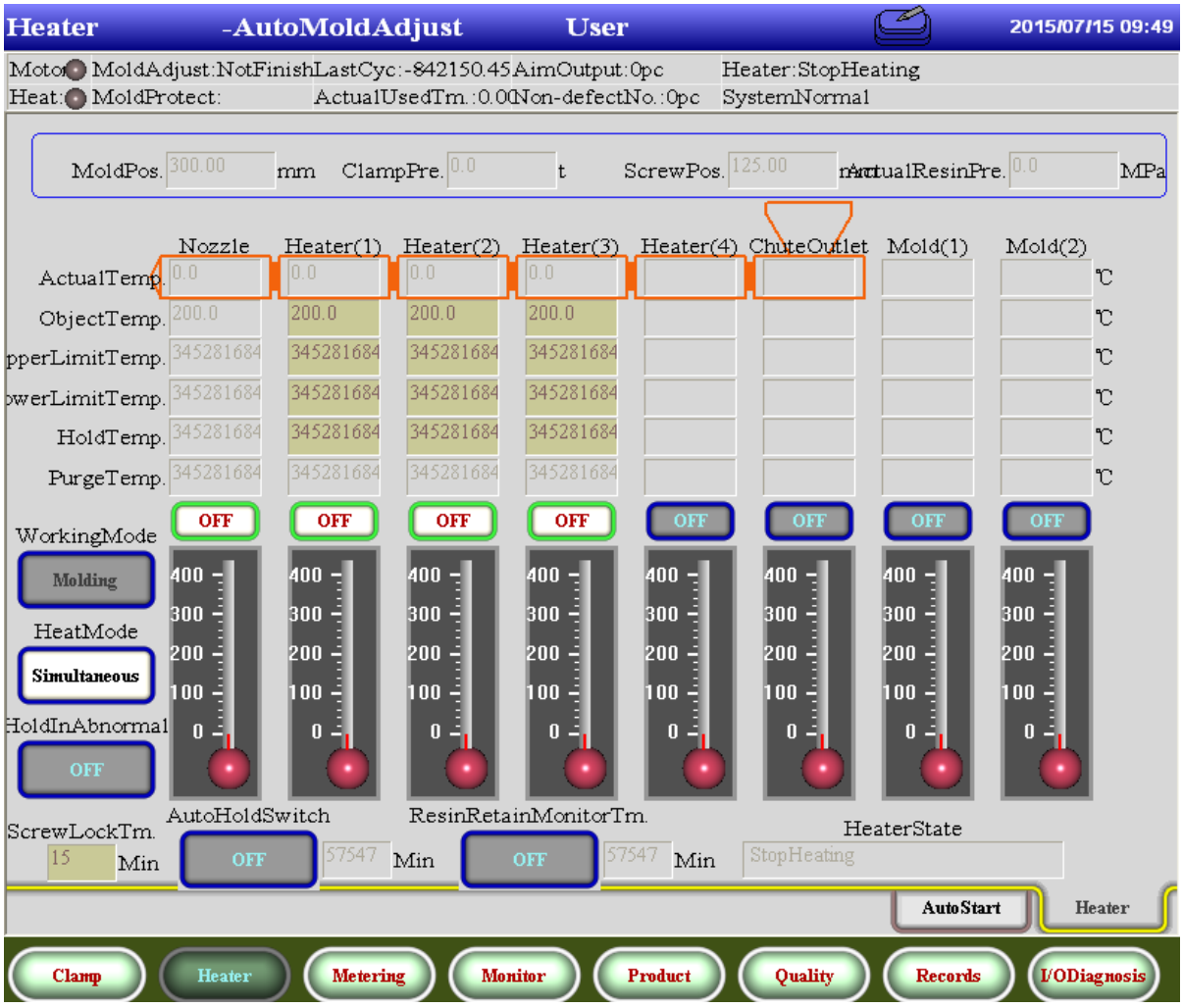
(1) The temperature setting of the heating zone is varied from product's raw materials, but it must be observed a rule, for example, the temperature is gradually decreased from the

nozzle to the back, and the D-value of the decrease temperature can be freely adjusted based upon the actual situation.

(2) Specially, for example, the scrapped part spinning, the nozzle temperature may be decreased, if the condensing of the special raw material is fast, the nozzle temperature is higher 10 degree than the second section Flange one, such as the PPS, nylon etc.

Check the temperature value of the common plastic raw material for the defined temperature setting. ☆☆☆

4.3.2.2.2 [Heater] Page



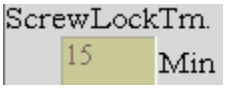
[Heater] interface is responsible for setting and displaying to the temperature of cartridge heater.

4.3.2.2.2.1 Start of Cold Start Prevention

The cold start prevention function starts when the setting temperature is reached. Even if the actual temperature of the nozzle and hopper are stable, but sometimes, it does not conduct to the screw and hopper, in this case, if the screw is rotated, it may be damaged. And therefore,

in an extent time, it is necessary to forbid the screw operation even if the temperature in the overall regions should be reached to the setting value.

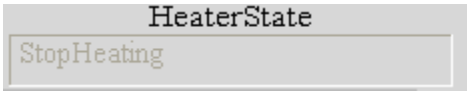
4.3.2.2.2.2 [ScrewLockTm.]



[ScrewLockTm.]: its setting range is 0～45min,

The default value is 15min, it is better not to modify it. If the user forces to change it, the safety result may occur, and therefore, our company may not responsible for it!!!

4.3.2.2.2.3 Cold Start Prevention

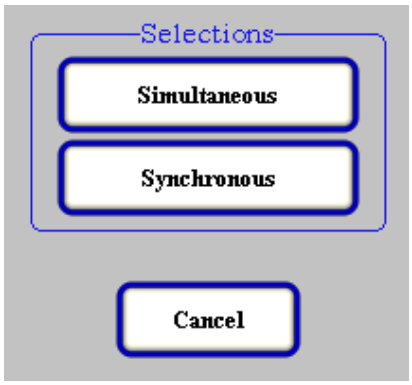


: The **[HeaterState]** of the **[Heater]** interface will display “Cold start prevention processing + residual time”;

In this case, any operation related with the screw can not performed in the **[MANUAL]**, **[Semi-Auto]** or **[Auto]]** mode.

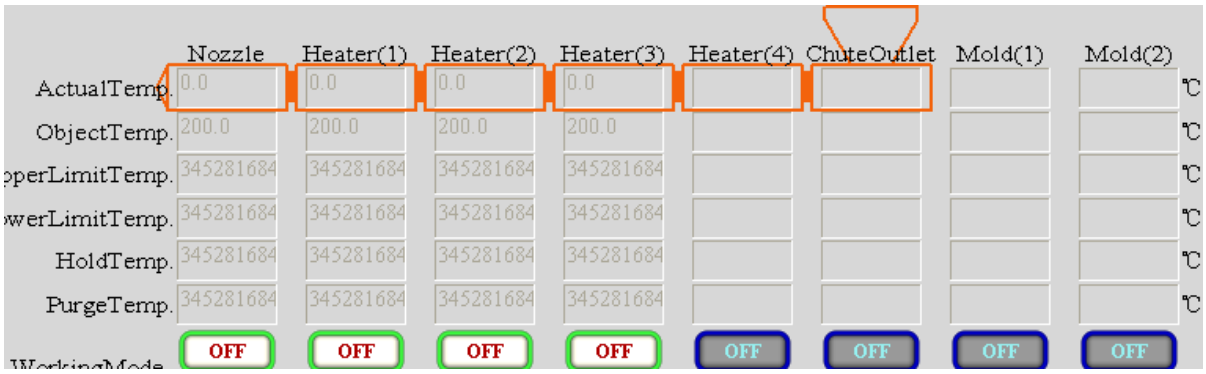
Click the

button, the following selection window may occur.



[Simultaneous]: Contemporary warming-up, Each warming-up module reaches to the temperature setting value according to the independent warming-up speed.

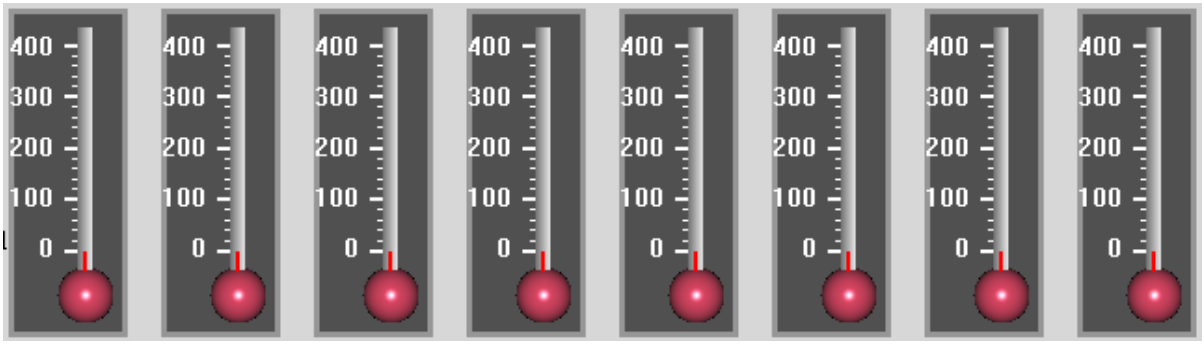
[Synchronous]: Synchronization warming-up, Each warming-up module reaches to the setting value based upon its unified warming-up speed.



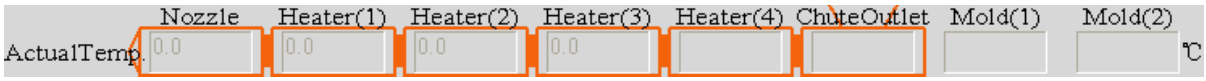
The **[ObjectTemp.])**, **[UpperLimitTemp.]**, **[LowerLimitTemp.],** **[HoldTemp.]** and

[PurgeTemp.] of the cartridge heater's related part can be set by the input frame from above-mentioned figure.

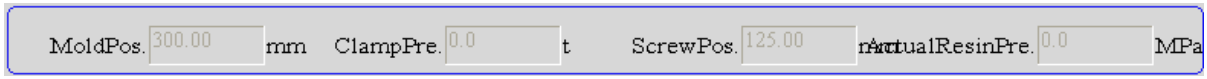
Its temperature setting range is 0～400℃;



The thermometer in the figure displays the actual temperature value of the current cartridge heater, and it corresponds with the above current temperature display frame.



4.3.2.2.2.4 Cartridge Heater Page Monitoring Data

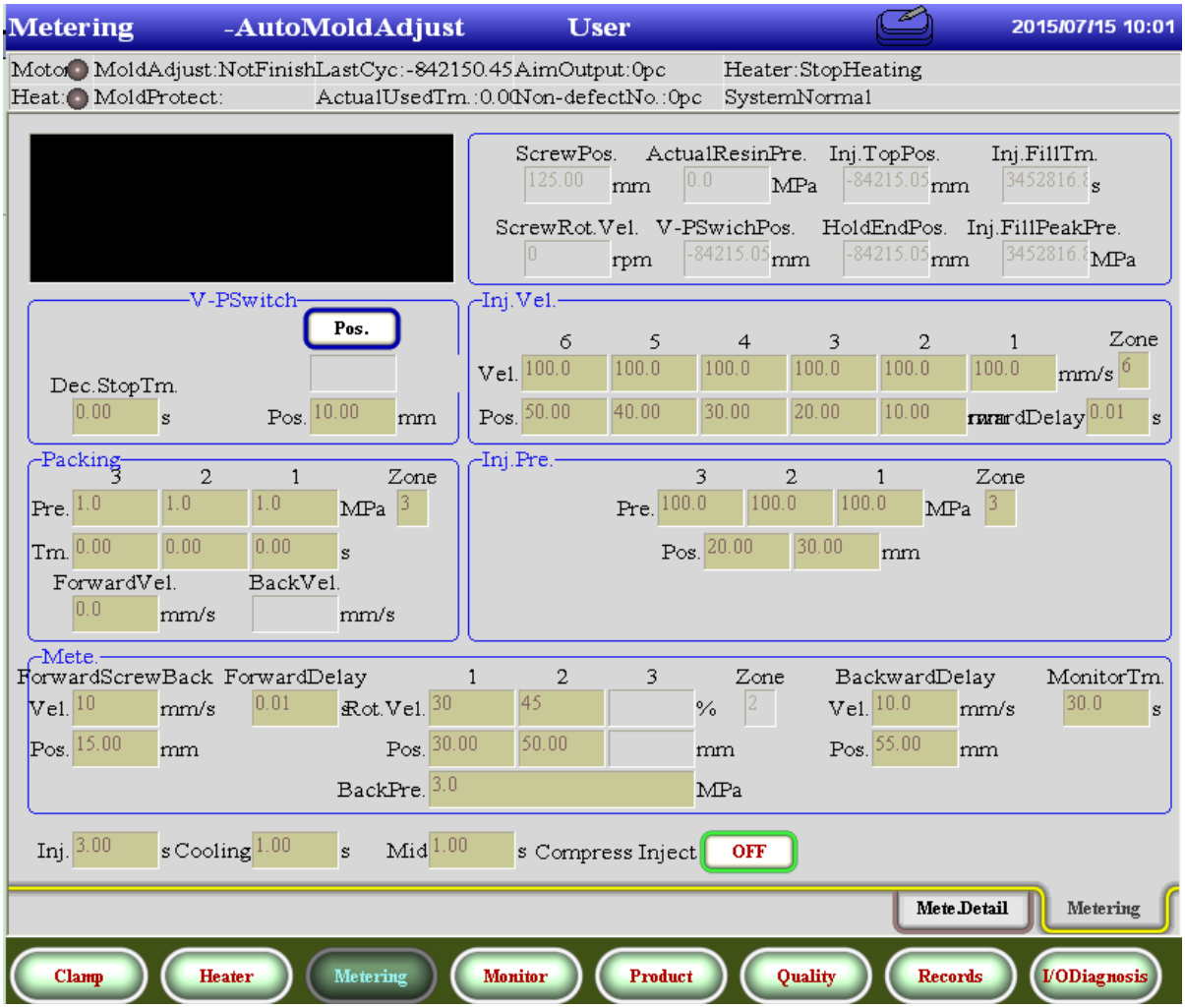


The monitoring area in this page is independent; each display unit can be freely selected based upon the requirements; refer to the Section 4.5.6 page customization for details.

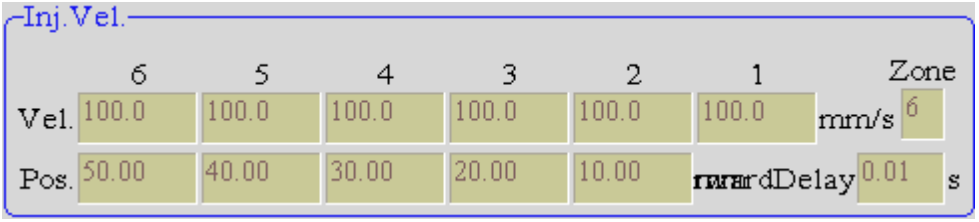
4.3.3 Injection and Metering

The **[Metering]** interface is responsible for the setting of the time, pressure, speed, position parameter during the injection and metering.

4.3.3.1 Injection Metering



4.3.3.1.1 Injection Speed Setting



means that the setting range is from section 1 to 6, which set to section 1, only the velocity 1 is enabled; when it is set to 2, the velocity 1, velocity 2 and position 1 are enabled, and so on; V1～V6 are injection velocity, and its setting range is 0 mm/s～300mm/s.

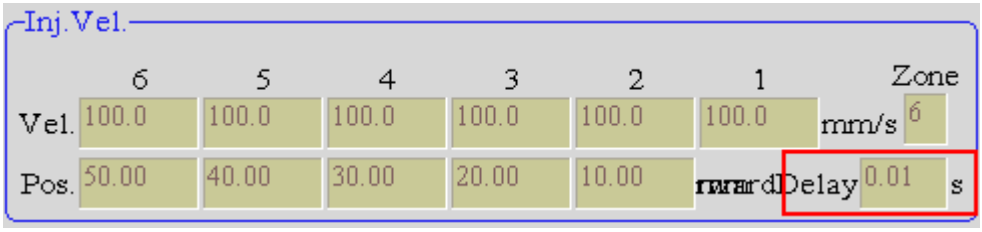
The setting of each screw position should be abode by the following rules:

Metering end position > the 2nd section > the 3rd section > the 5th section > the 6th section > V-P Switch position;

The velocity of the injection speed is mainly considered the appearance of the molding and the resistance of the resin flow inside the cavity. It is necessary to observe the molding, and then

slowly changes velocity. The following faults may occur due to different resins or the thickness of the molding. (Generally, if the molding product is thick, it is better to eject with low velocity; if the molding product is thin, it is better to eject with high velocity.)

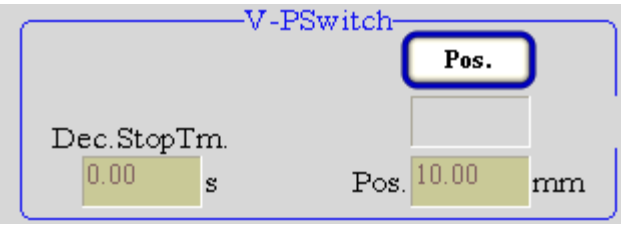
4.3.3.1.1.1 Delay Setting Before Injection



It is necessary to delay a period time before injection, in this case, the delay before injection should be set.

For example: It is important to set the stop time before injecting when hot runner waits for the heating up.

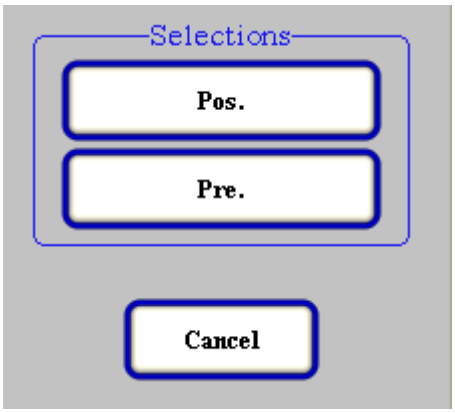
4.3.3.1.2 [V-PSwitch] Setting



There are two shifting methods of **[V-PSwitch]:**

1. **[Pos.]:** Screw position shifting;
2. **[Pre.]:** Injection pressure shifting;

The system may show the selection frame when click the **[V-PSwitch]** button. Refer to the following figure:



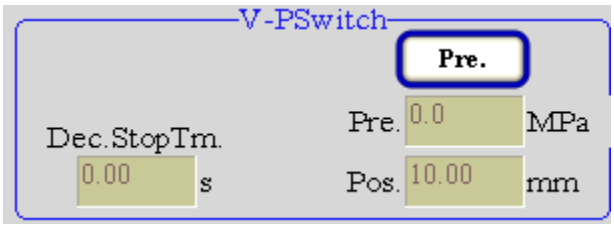
1. **[V-PSwitch]** based upon its position method:

The position of the screw can be shifted to the packing state when it arrives to the V-P

position shifting setting value

Precaution: If the screw position always can not reach to the set shifting position during injection, the screw is then stopped after completing the set injection time.

2. **[V-PSwitch]** based upon pressure method:



a. When the injection is performed, the pressure within the charging barrel reaches to the set shifting pressure; it is then shifted to the packing state;

b. When the pressure can not reach to the shifting pressure during the injection, but the screw position reaches to the shifting position, it is then shifted to the packing state.

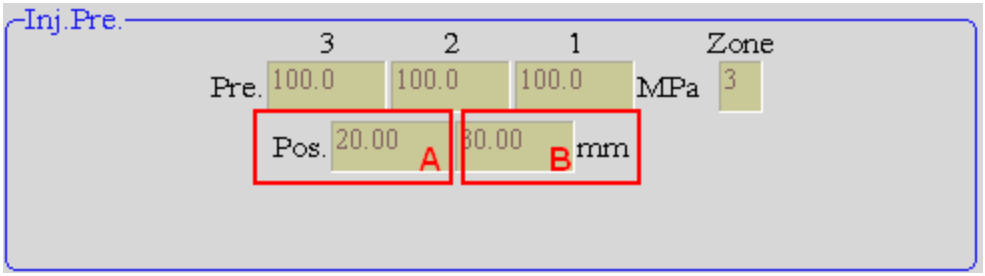
c. When the injection pressure can not reach to the shifting pressure or the screw position can not reach to the shifting position during the injection; and then it can be shifted to the packing state after performing the set injection time.

Precaution: When the pressure is regarded as the shifting method, adjust the shifting pressure, shifting position and injection time based upon the different technology requirements. It can be shifted to the packing state as long as one of them reaches to the setting value.

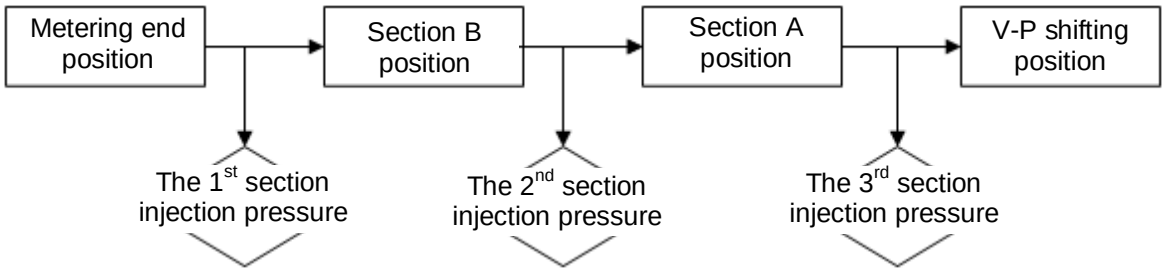
Deceleration stop time (**[Dec.StopTm.]**) setting:

When the **[V-PSwitch]** on the **[Metering]** page is passed, it is shifted to the pressure control from the speed control; in this case, the deceleration procedure can be controlled based upon the time setting of the **[Dec.StopTm.].**

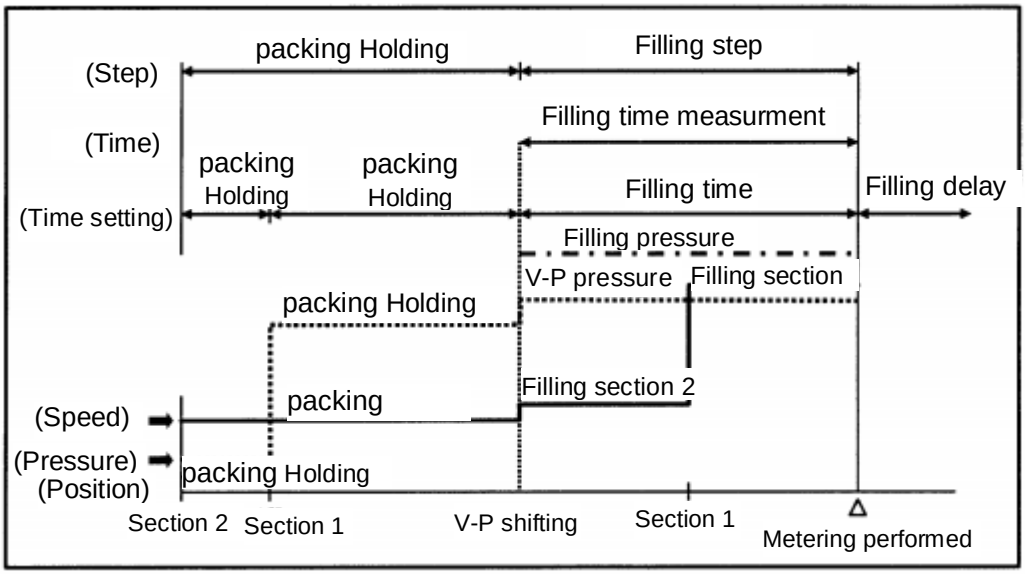
4.3.3.1.3 Injection Pressure ([Inj.Pre.]) Setting



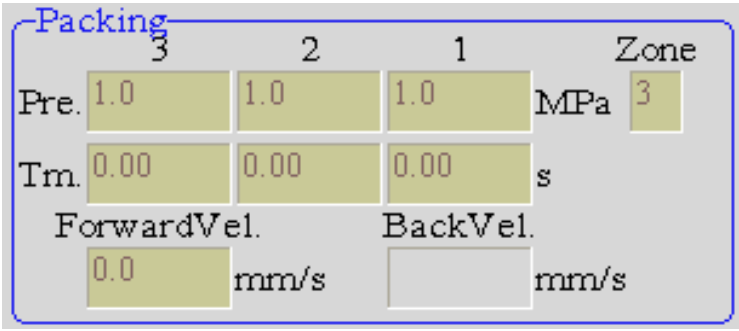
Injection pressure usage:



Motion schematic (2-section injection, 2-section packing)



4.3.3.1.4 Packing Setting



It is necessary to consider the operation state and residual stress forcing to the forming product and resin solidification when setting the packing sections.

Simultaneously, the pressure difference of the backpressure should be considered after the ejection pressure and packing are executed.

The optimal forcing is balanced at the overall sections of the molding product to solidify the resin. The most setting is the pressure according to the different distance of the gate within the time of the gate enclosure, and the pressure is hard to perform where the place is far from the gate along with the resin cooling and the solidification on the surface of the molding product. The solidification state of the molding product is firstly performed from the surface and the start of the

molding product for the operation state and packing position of the solidification.

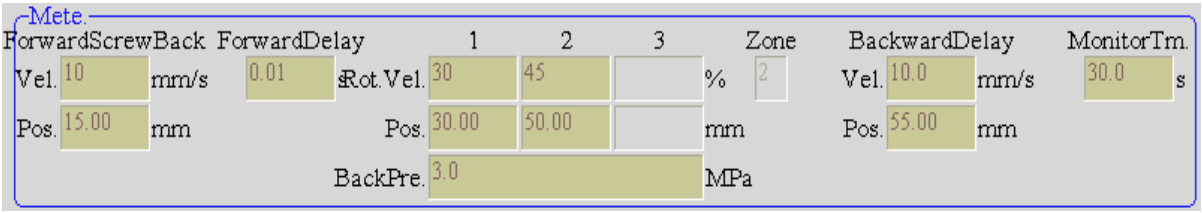
Ejection project owns the function for remedying the resin shrinkage; that is, the melting resin is absolutely filled inside the mold, however, it may cold step by step as time goes on; the shrink mark or distortion may occur because the resin becomes smaller.

The shrink mark and demolding, etc. will be still generated if the resin does not absolutely melt, even if the suitable packing is set.

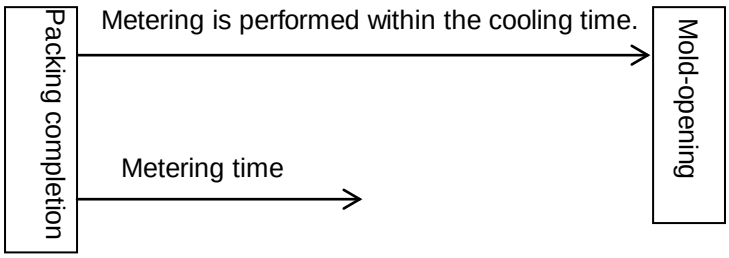
★ The pressure setting at the initial time is performed based upon the peak pressure during ejecting and V-P (from the starting of ejecting to the packing shifting position) pressure to determine the packing time.

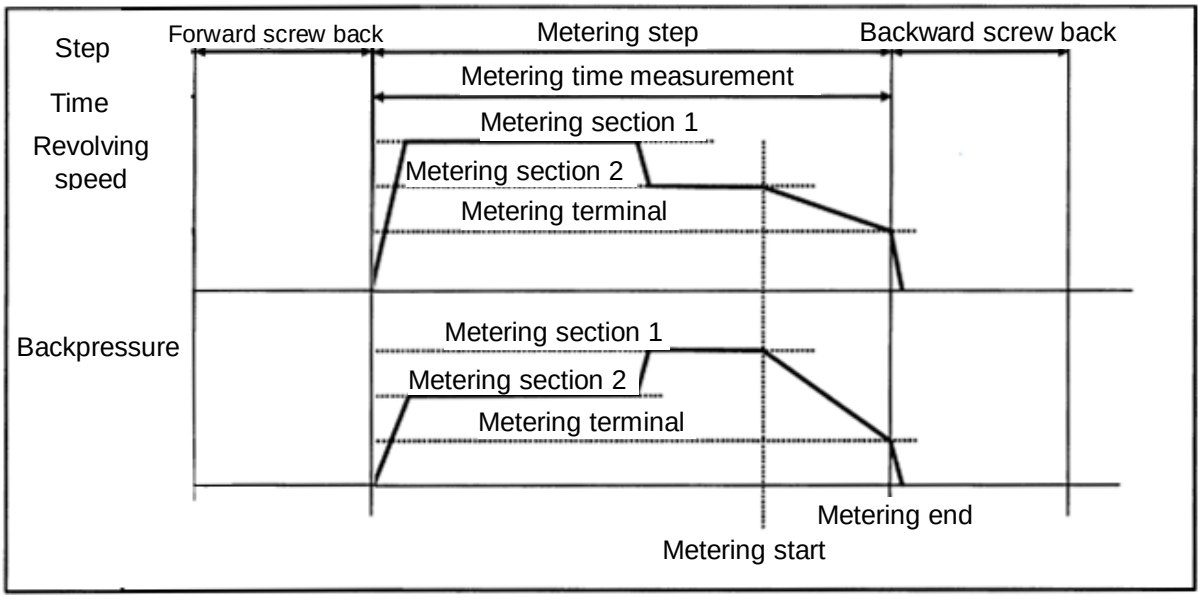
★ After the packing time is set, change the packing section numbers and pressure within the packing time to confirm the molding product.

4.3.3.1.5 Metering

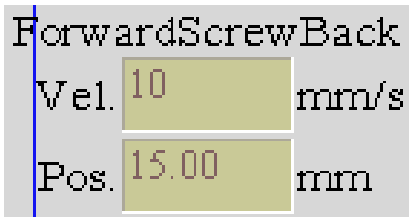


4.3.3.1.5.1 Metering Procedure



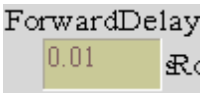


4.3.3.1.6 Metering Forward Screw Back



It is used for setting the position and velocity of the screw retreat before metering. (Generally, it is used for decompressing to prepare for the beginning of the metering.)

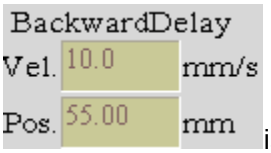
4.3.3.1.7 Delay Before Metering



is used for setting the delay before the screw operation at the beginning of the metering, its unit is second.

Prompt: If the time is too long from the completion of the injection to the last mold-clamping, reasonably use the delay before metering to reduce the existence time of the raw-material within the barrel, so that the quality of the melting material can be improved.

4.3.3.1.8 Metering Backward Screw Back



is used for setting the position and velocity of the screw rod retraction after the collosol is performed.

Purpose of the backward screw retreat:

The charging barrel has the collosol pressure during the collosol is performed; suitably set the plastic-pumping distance to reduce the pressure inside the barrel. Guard against the tape casting.

Reference:

① The calculation of the screw metering position (position return).

Screw rod metering (position return) can be calculated in advance based upon the following expressions:

The weight of molding product×1/proportion × the screw rod movement value equivalent to the 1g ejection value + 5mm= screw rod metering position

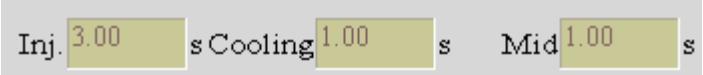
It is equivalent to the screw rod movement value of the 1g ejection amount, which determines to the diameter of the screw rod, stroke and the Max. ejection value.

5mm is the setting occasion from the ejection to the packing shifting position.

② Generally, enter to the metering project after the packing is performed. If the melted resin

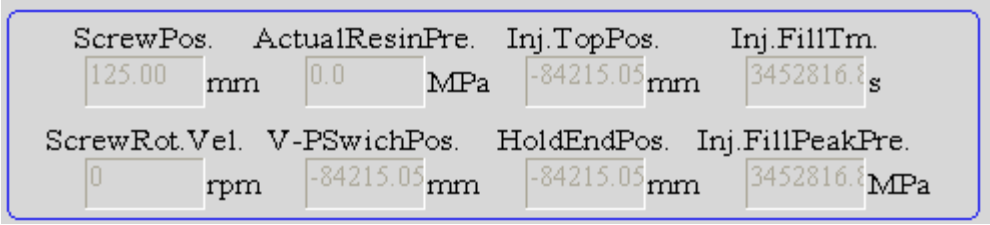
inside the charging barrel is converted in the melting state, some resin may be caused burnt or distorted. So, it is better to simultaneously complete the metering procedure within the cooling time. The metering start time is the stopping time before metering after the packing is performed.

4.3.3.1.9 Other Related Setting (Time-consuming, Data Express)



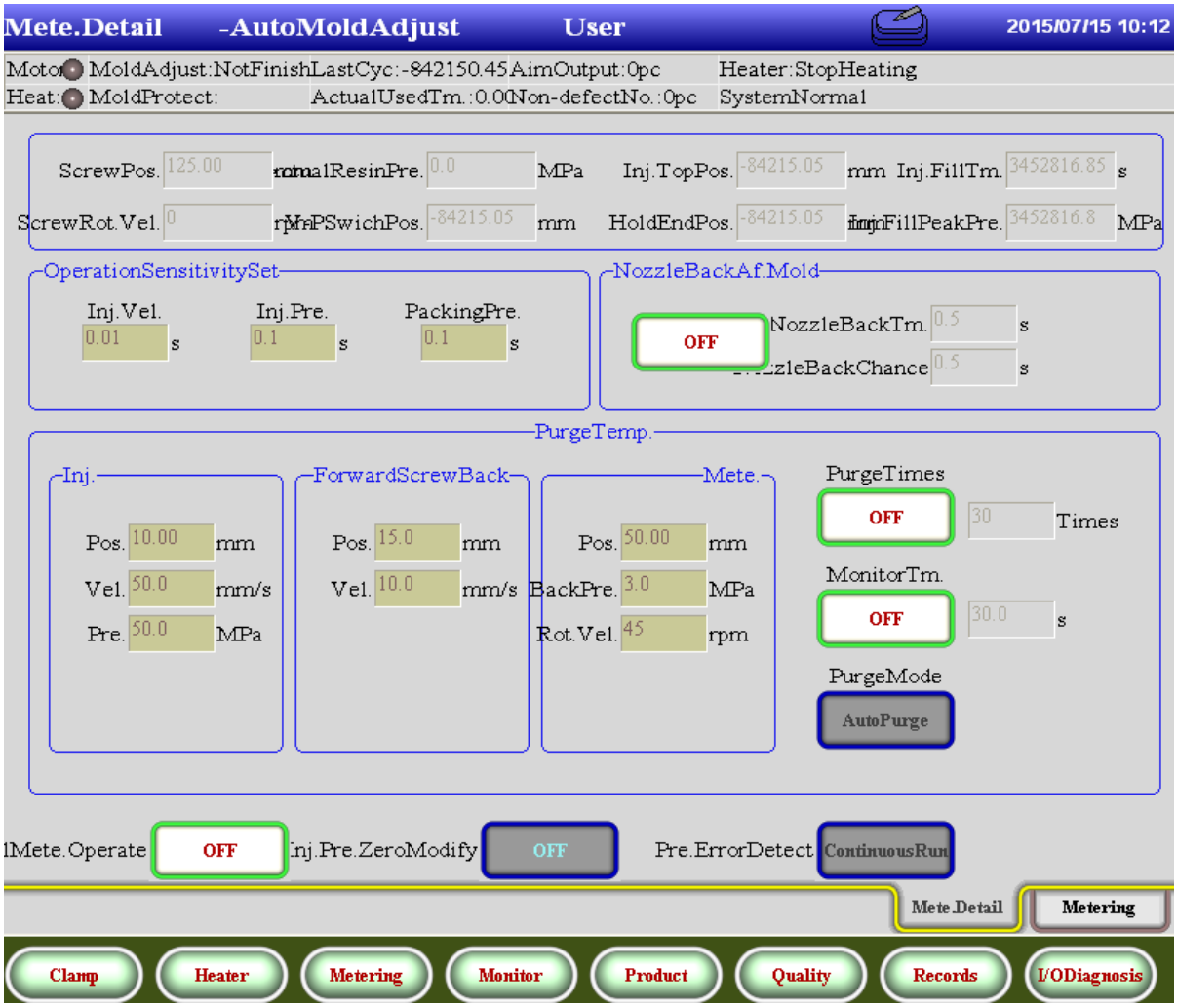
Ejection	The injection filling time (do not contain the packing time), It is better more than 0.2～0.5s comparing the "Injection filling time**[Inj.FillTm.]**" in the Data Table.	Cooling	The timing from the packing ending to the beginning of the mold-opening is set based upon the product's section thickness and material.
Middle	After the beginning timing of the ejector is completed and the intermediate time is performed, the current period timing continues till the next period starts.		

4.3.3.1.10 Monitoring Data on [Metering] Page



The monitoring area in this page is independent reacts the current system data value with real-time. Each display unit can be freely selected based upon the requirements, refer to the Section 4.5.6 for the page customization.

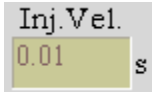
4.3.3.2 Injection Metering Details ([Mete.Detail])



4.3.3.2.1 Setting of Motion Sensitivity ([OperationSensitivitySet])

sets the desired time for reaching to the top injection velocity, and its unit is second.

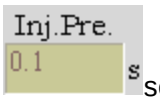
Its setting range equals to 0.01 s～1.00s.

For example: Set the 

[Inj.Vel.] as 0.8s.

If the rated speed 100% of the 1st section of the **[Metering]**, the reach time of the setting speed is 0.8s.

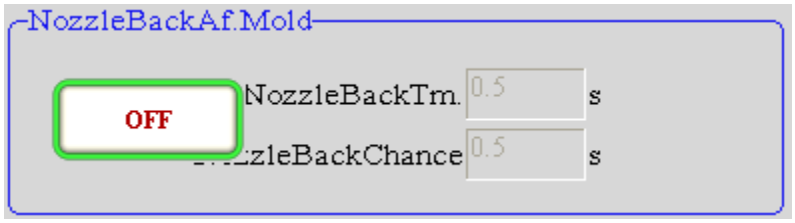
If the rated speed 50% of the1st section of the **[Metering]**, the reach time of the setting speed is 0.4s, and so forth.



sets the desired time for reaching to the top injection pressure, its unit is second.

sets the desired time for reaching to the top packing pressure, its unit is second. Refer to the injection velocity sensitivity setting for the usage.

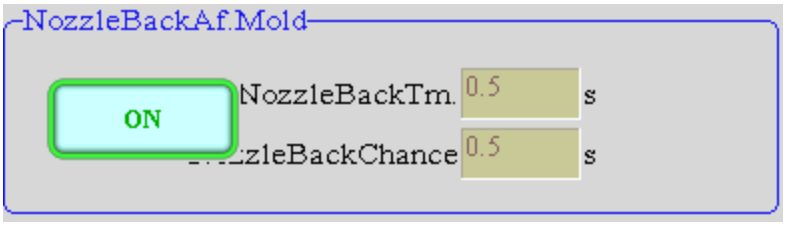
4.3.3.2.2 Nozzle Retreat After Molding ([NozzleBackAf.Mold])



Shifting to

state after controlling the

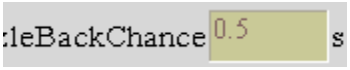
button:



In this case, the nozzle retreat time (**[NozzleBackTm.]**) and retreat Chance (**[NozzleBackChance]**) can be set. (Unit: Second)

: In the automatic mode, the equipment retreat time is performed when the

is opened.



: In the automatic mode, the delay time of the ejection equipment retreat is performed when the

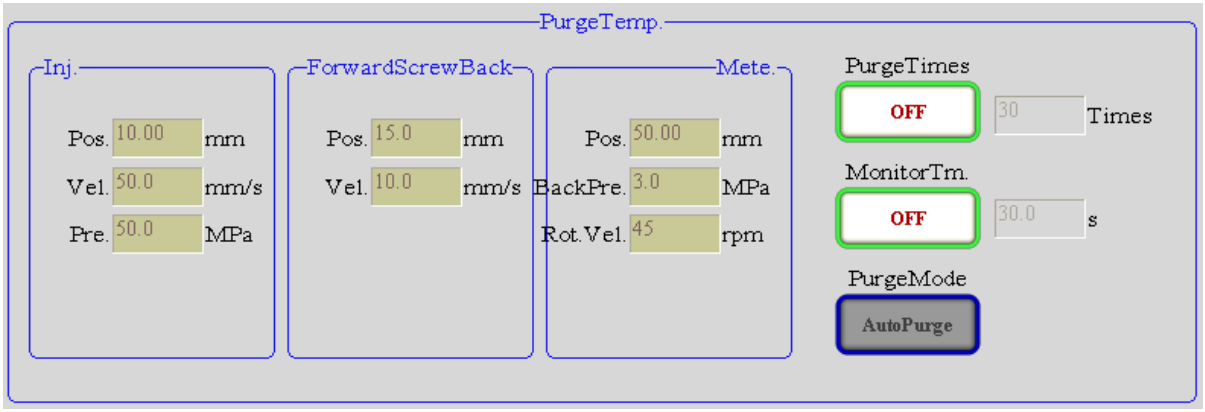
is opened.

function does not work yet.

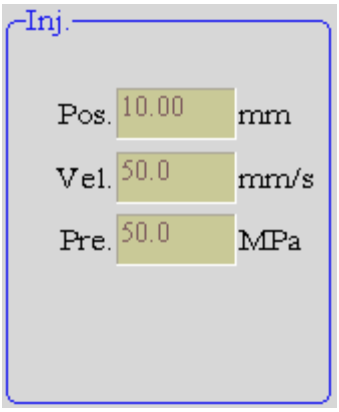
function does not work yet.

function does not work yet.

4.3.3.2.3 Material-Cleaning ([PurgeTemp.])

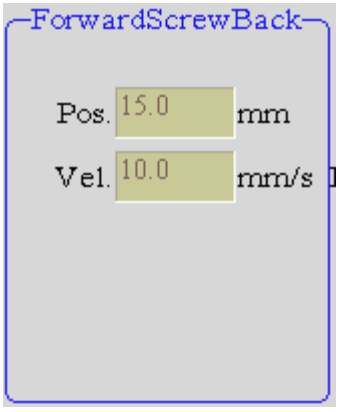


Generally, the material-cleaning has three operations: The **[ForWardScrewBack]** starts after the **[Inj.]** is performed; the **[Mete.]** begins after the **[ForWardScrewBack]** back is performed; the metering in-position, material-cleaning performs a cycle.



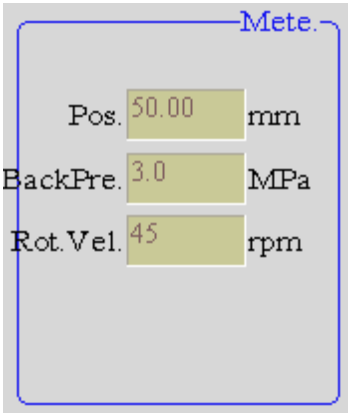
The injection ending position ([Pos.]), injection speed ([Vel.]) and injection pressure (Pre.) should be set during the machine injection is performed.

Name	Setting meaning	Setting range
Position	Set the ending position of the material-cleaning ejection	V/P shifting position during the injection
Velocity	Set the velocity of the material-cleaning ejection	0 mm/s～100mm/s
Pressure	Set the injection pressure during the material-cleaning	0 MPa～170MPa



The retreat position ([Pos.]) and the Velocity ([Vel.]) during the collosol is performed.

Name	Setting meaning	Setting range
Position	Set the plastic-pumping value of the material-cleaning operation revolving	0 mm～75mm
Velocity	Set the plastic-pumping speed of the material-cleaning operation	0 mm/s～30mm/s



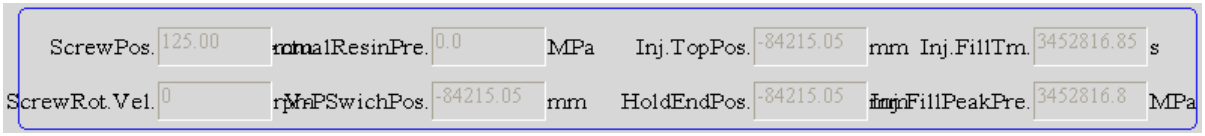
The metering pressure should be set the metering ending position ([Pos.]), backpressure ([BackPre.]) and revolving speed ([Rot.Vel.]).

Name	Setting meaning	Setting range
Position	Set the position of the material-cleaning operation metering ending	0～99.99
Backpressure	Set the metering backpressure of the material-cleaning operation	0 MPa～220MPa
Revolving Velocity	Set the metering revolving Velocity of the material-cleaning operation	0～100%

[PurgeTimes]: The system is set to 1 time by default; user can modify the material-cleaning times based upon the requirements.

[MonitorTm.]: The system is set to 60sec by default, the metering screw does not reach to the specified position when the monitoring time is carried out, and the system alarm may occur.

4.3.3.2.4 Monitoring Data on [Mete.Detail] Page

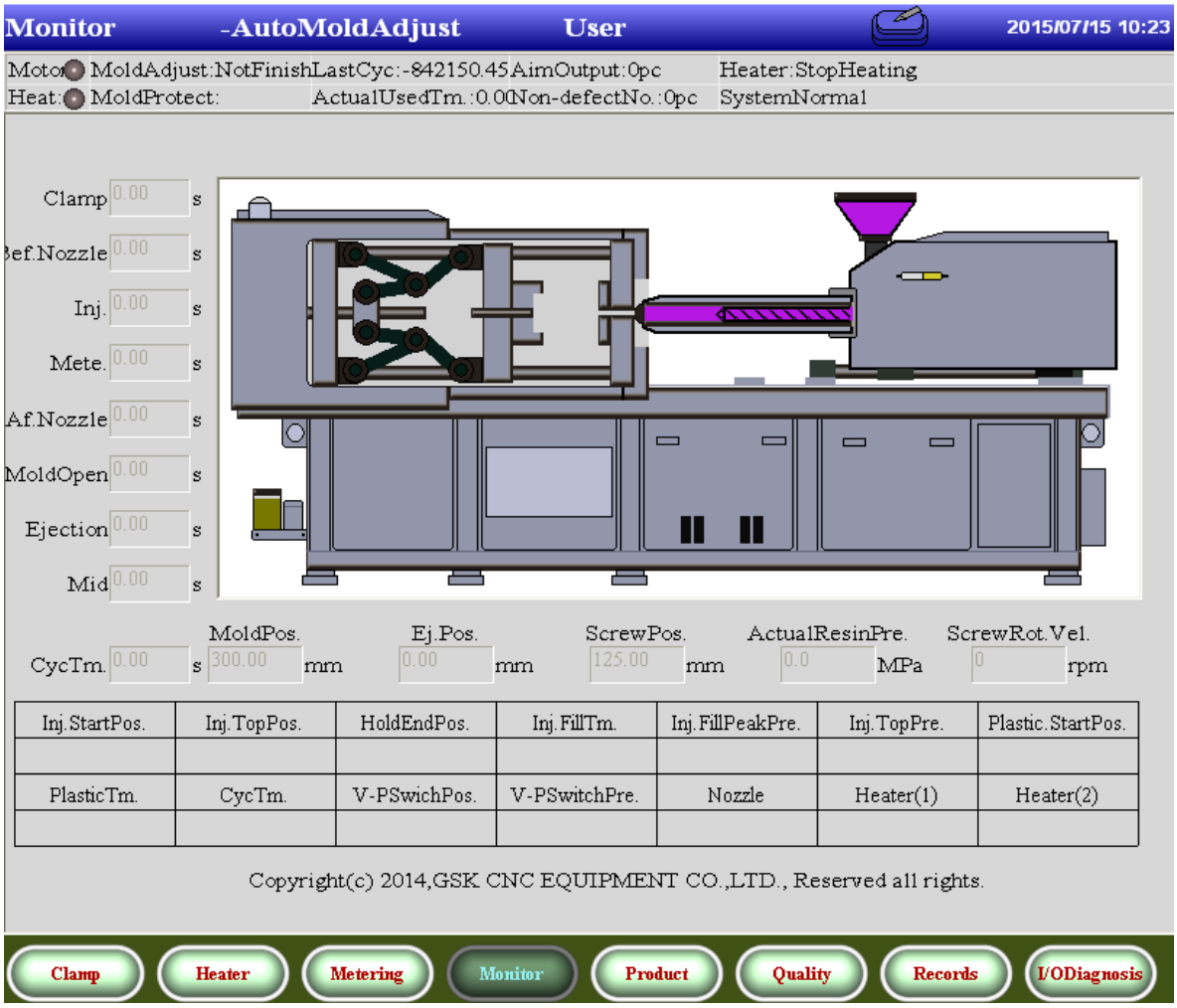


The monitoring area is independent on this page, each display unit can be freely selected based upon its requirements, refer to the page customization at the Section 4.5.6.

4.4 Production Management

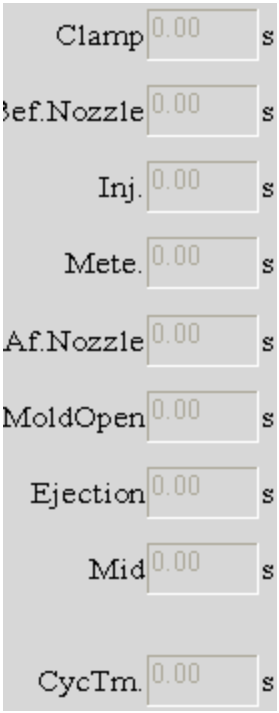
4.4.1 Project Monitoring

4.4.1.1 [Monitor]



The **[Monitor]** interface displays current production status of injection molding machine. It includes four display parts: flow, real-time, data recording, and animation demonstration.

4.4.1.2 Flow Display



This part is arranged according to injection molding flow from top to the bottom. When injection molding machine executes one process, the display box of this process flashes and it displays the execution time after the operation is performed. Note: cooling time is included in the time of **[Af.Nozzle]**

4.4.1.3 Real-Time Monitoring

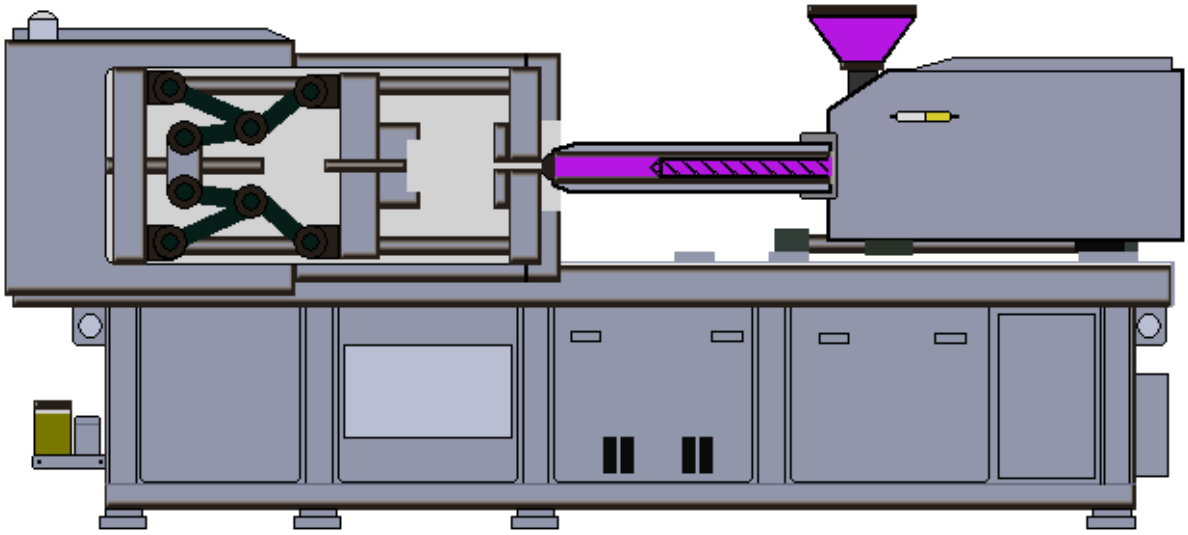
The data display box of this part displays current value of the injection molding machine.

4.4.1.4 Data Recording

Inj.StartPos.	Inj.TopPos.	HoldEndPos.	Inj.FillTm.	Inj.FillPeakPre.	Inj.TopPre.	Plastic.StartPos.
PlasticTm.	CycTm.	V-PSwichPos.	V-PSwitchPre.	Nozzle	Heater(1)	Heater(2)

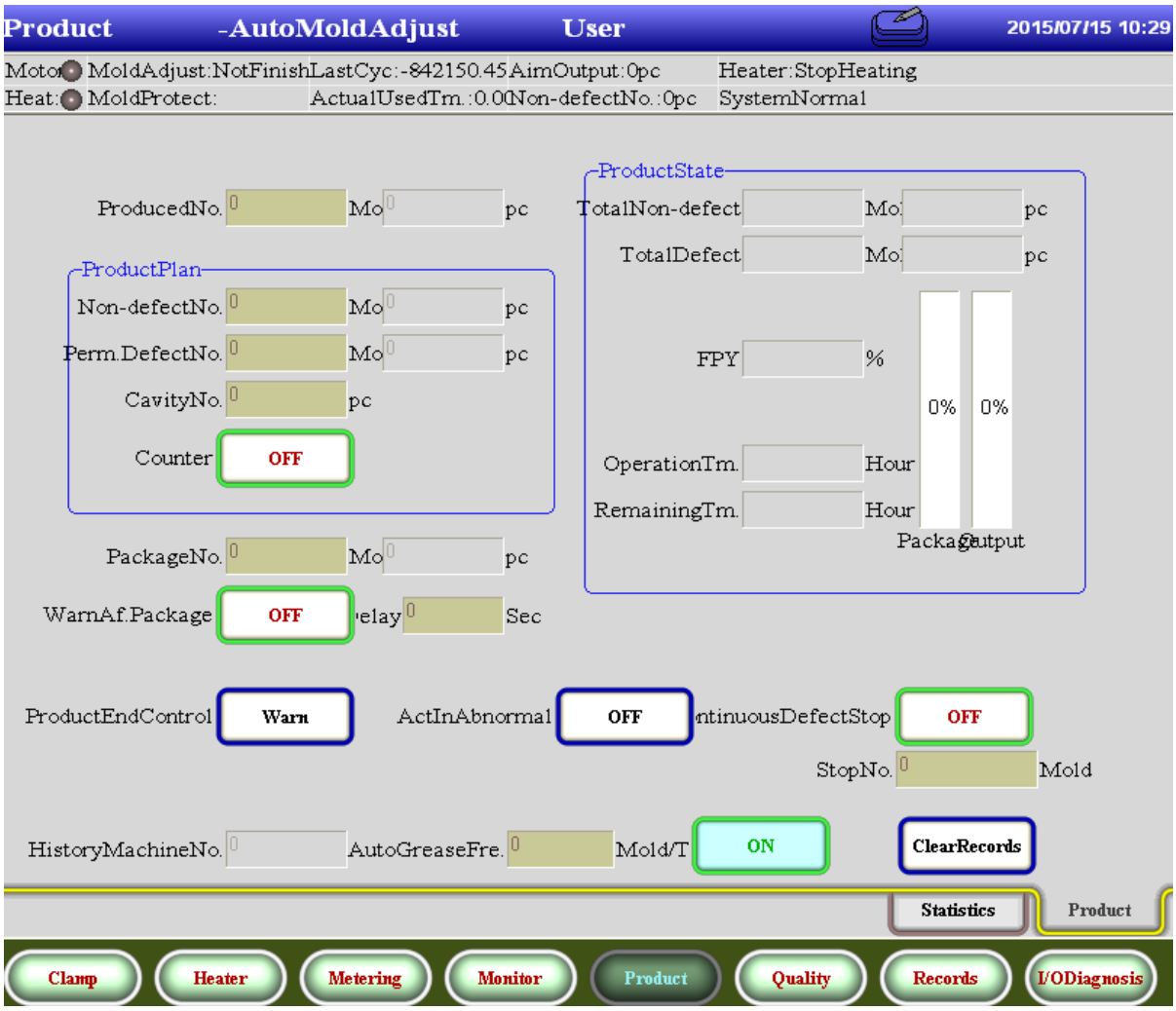
This section displays the listed data value for recording the production schedule.

4.4.1.5 Animation Demonstration



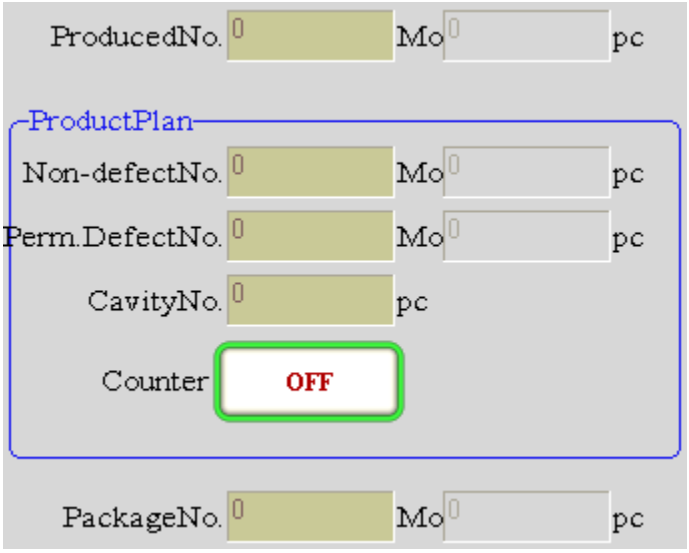
This part is demonstrated the operation state of the injection molding machine with real-time by the animation form.

4.4.2 Product Management



This interface is responsible for recording and administrating the data during the product, **especially**, the relevant data of the quality-product/inferior-product on this interface should be set parameter in the **[Quality]** page and then open the **[Non-defaultJudge]** function; otherwise the inferior-product judgement can not be performed.

4.4.2.1 Operation Procedure

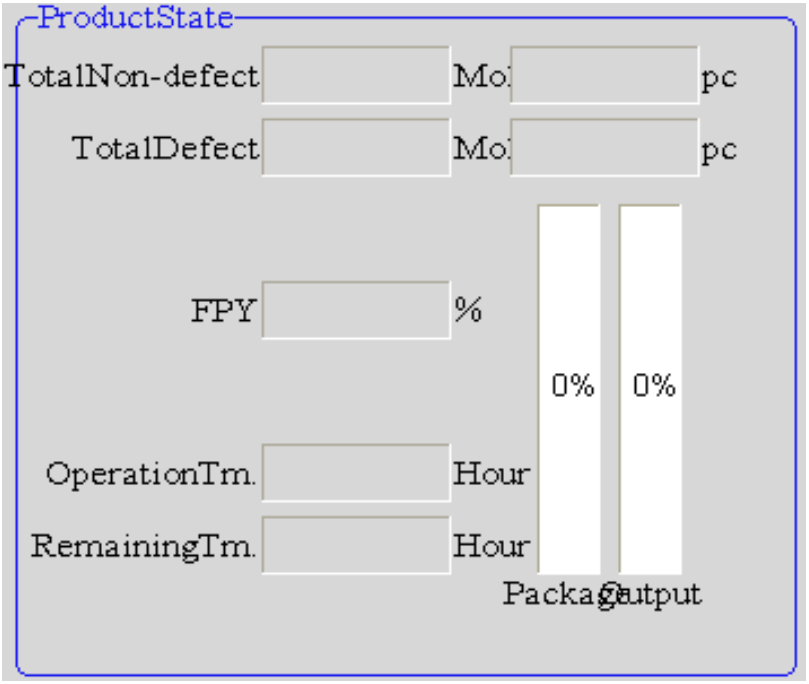


Firstly set the total product (**[ProduceNo.]**) (The number of the finished part can be input), quality product number (**[Non-defectNo.]**), inferior product number (**[Perm.DefectNo.]**), single-mold product number (**[CavityNo.]**), packing number (**[PackageNo.]**).

Click

, and it turns into

highlighted state. At this time, count function is active and it begins to count. The number is displayed in the record display box at the right side.



If necessary, click

button to start packing completion prompt. It counts number according to the packing number set before. Alarm occurs when the number reaches set figure.

4.4.2.2 Other Operations

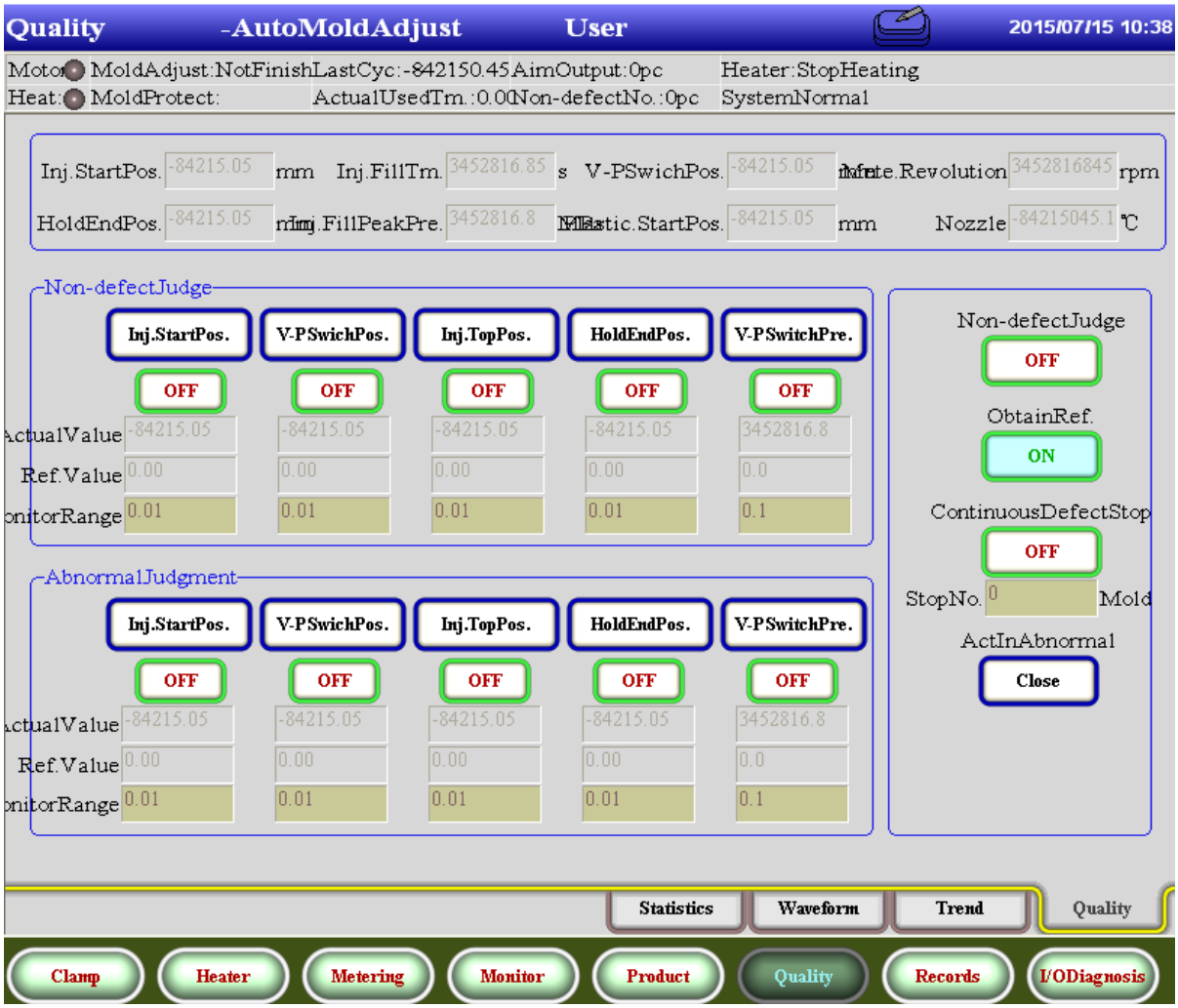
The selection window will display by clicking the

button;

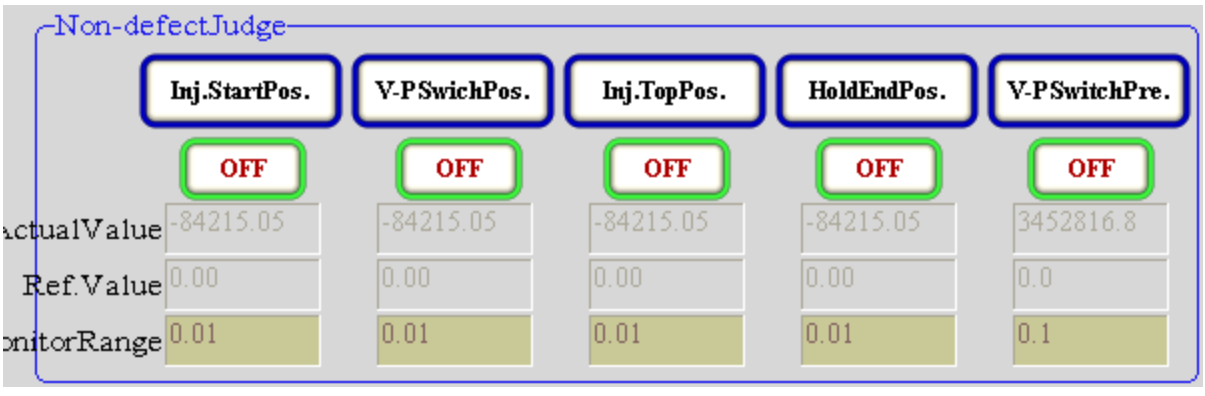
[Warn] and **[WarnBuzz]** may be generated when the overall production numbers are reached to the setting value, alternatively.

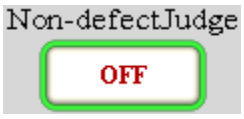
displays the frequency of the automatic grease-supply; refer to the automatic grease-supply frequency of common operation for each mode in the Section 4.2.2.1 in this User Manual;

4.4.3 Quality Management

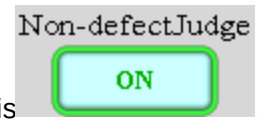


4.4.3.1 Quality Judgement



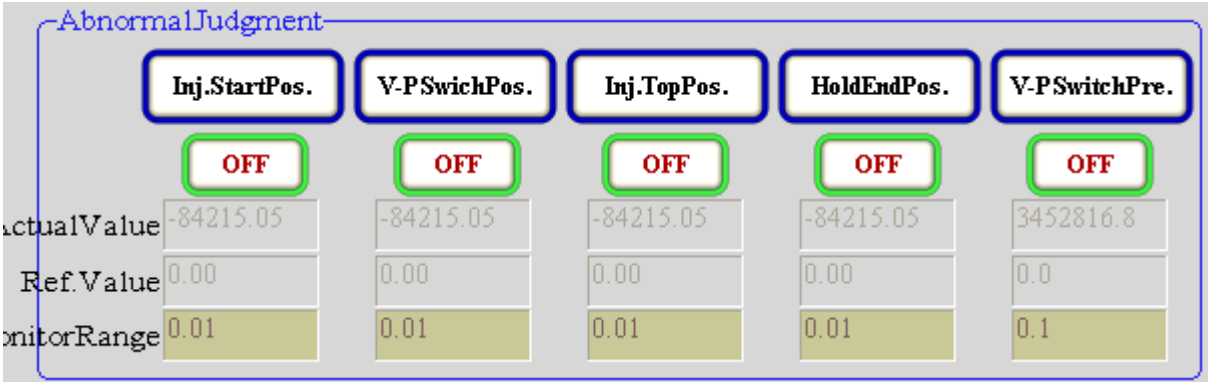


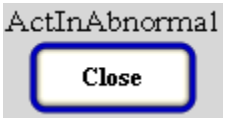
is the overall switch of the quality judgment, its start state



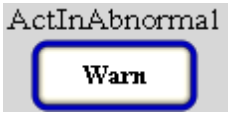
is . Refer to the integrated operation for detailed.

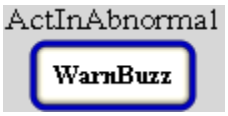
4.4.3.2 Abnormal Judgment





is the total switch of abnormality judgment, its start state is



or 

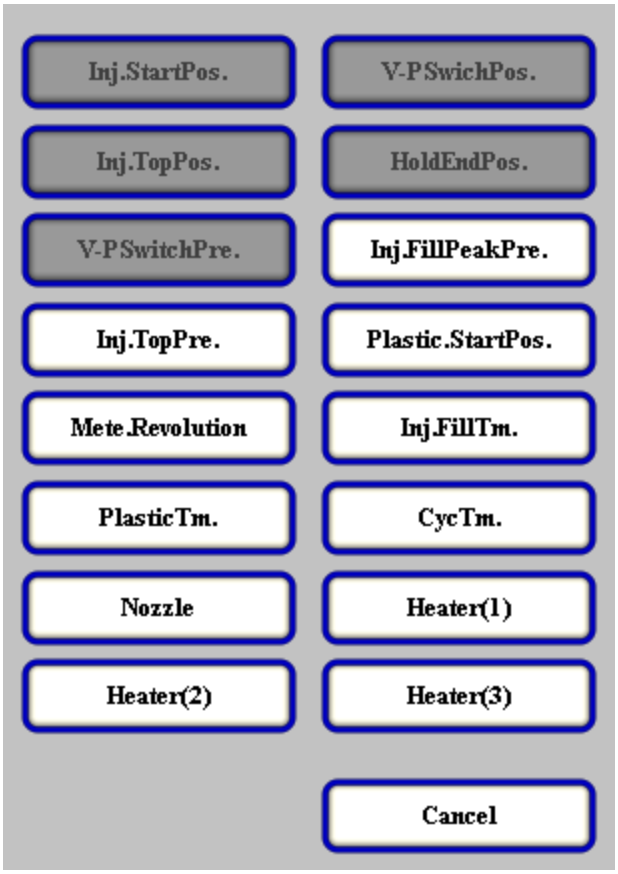
. Refer to the following comprehensive operation for details.

4.4.3.3 Comprehensive Operation

There are 5 sections for the quality product judgment; each part consists of function selection, start button, measured value, reference value and monitoring amplitude.

Click the function button in the above-mentioned sections, for example, the

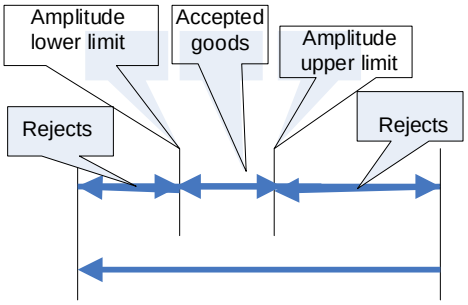
button, the following figure may occur:



Different monitoring points can be selected based upon its requirements.

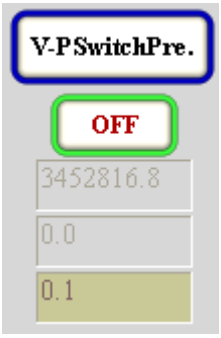
Reference value setting is used in the product quality detection. The current product is inferior one as long as one procedure in the machining exceeds the setting value.

Monitoring point can be judged by the up-limit/lower-limit detection.

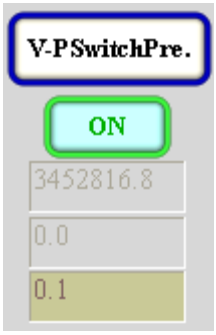


The measured value detection should be performed between the reference values +/- amplitude;

Reference value – Monitoring amplitude value < Measured value < Reference value + Monitoring amplitude value

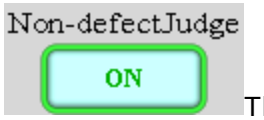


The quality product judges single function detection point close.



Switch quality detection start.

The quality product judges overall switch detection close.



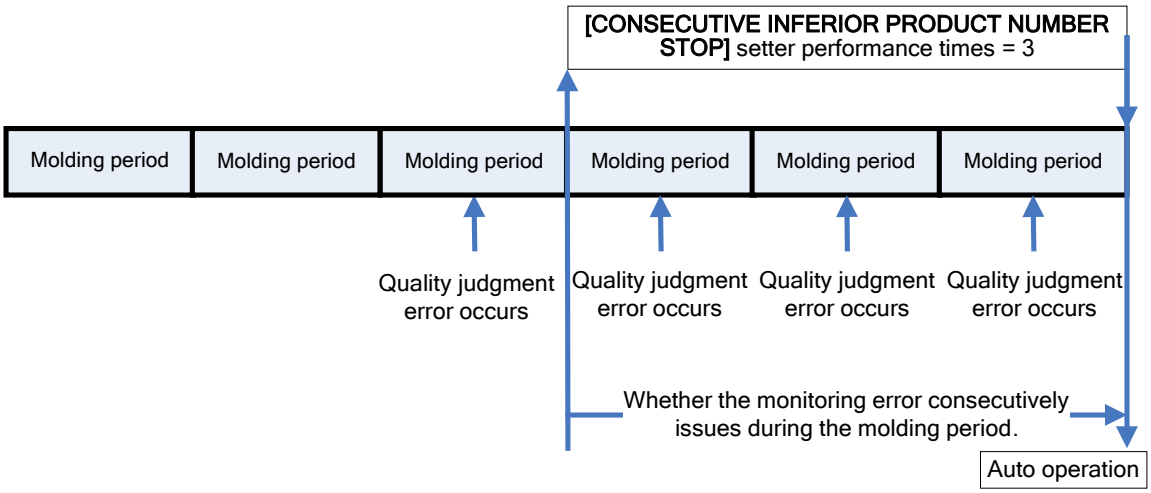
The quality product judges overall switch detection open.

Generally, press

after mold test is finished. Last operation time is automatically changed into engineering reference time, and the button recovers to the close state.

The button is selected whether to start the consecutive inferior product treatment operation in this

button. If this button is ON, set the consecutive inferior product numbers; when the consecutive inferior product numbers are reached to the setting value, select the stop treatment, simultaneously, the alarm occurs.



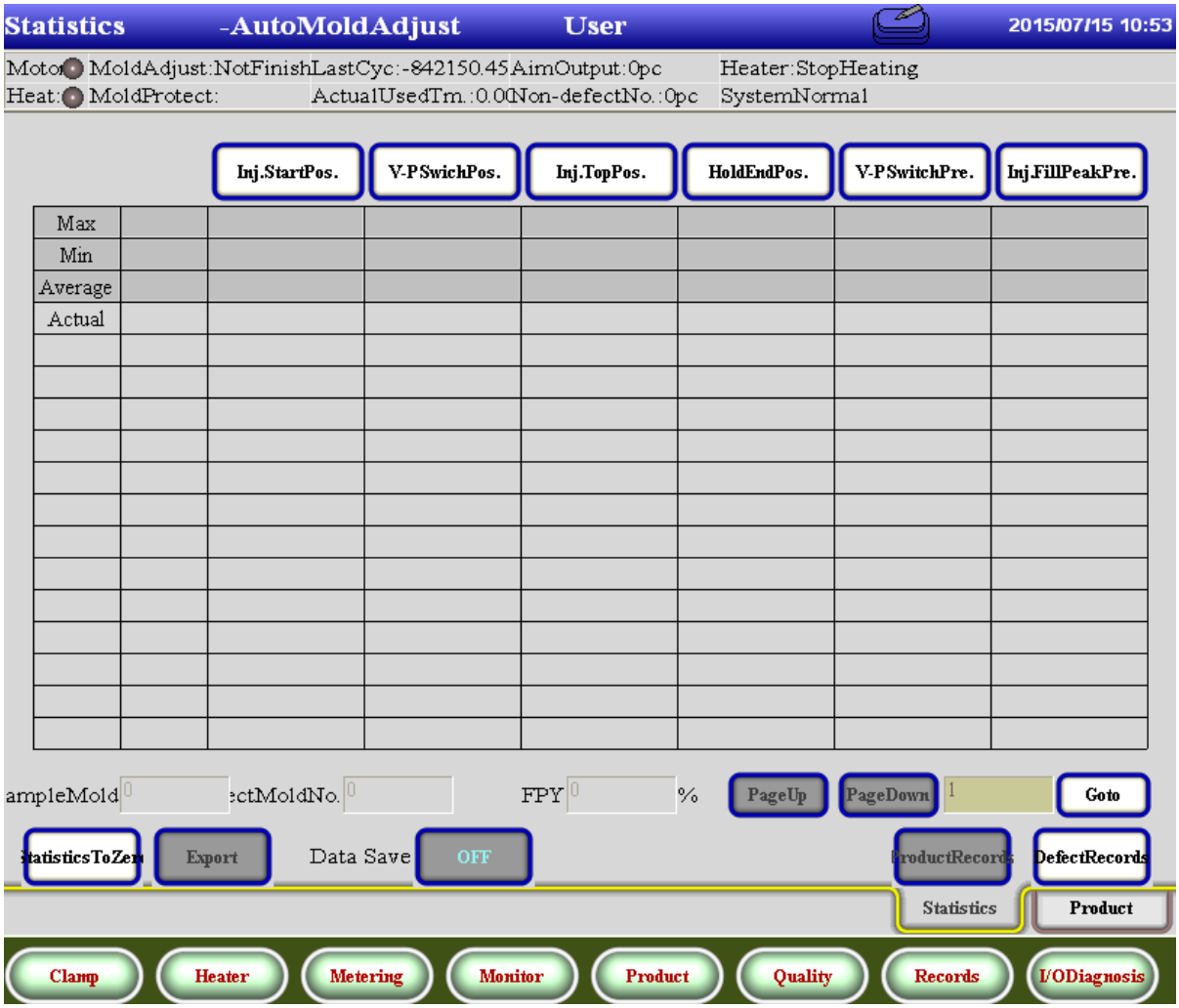
When inferior product is found in auto operation:

In a molding cycle, once an error of reject is detected, the system will monitor whether continuous errors occur in the following molding cycle. When the number of error reaches the specified one in **[ContinuousDefectStop]** Number, the injection molding machine stops before the current molding cycle is finished, but no longer executes the next cycle. Alarm is issued from error display and alarm.

When **[ContinuousDefectStop]** is set to 0, with 【Inferior Product Stop】transfer switch on **[Monitor]** page, the machine switches into the action of mold locking device in abnormal operation.

4.4.4 Statistics

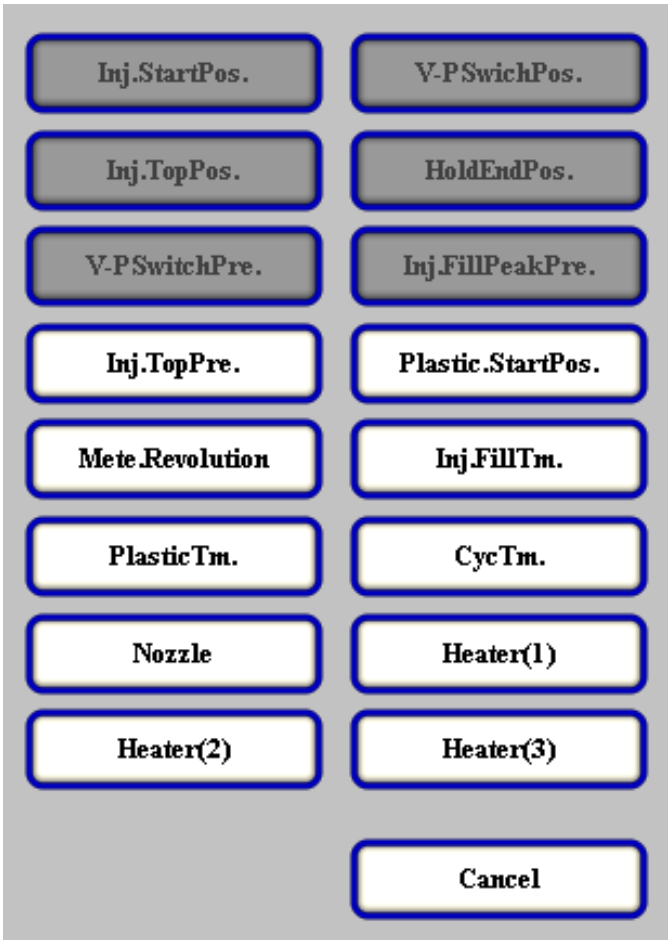
4.4.4.1 Production Record Display



[Statistics] interface displays its corresponding data after each machining is performed in the state of **[FULL-AUTOMATIC]** or **[SEMI-AUTOMATIC]**.

The data recorded in this section is 8-mold production data and the Max./Min./Average value from the nearest to the current time.

The selection window may generate by clicking any one of the following 6 buttons, which is as follows:



Selected the desired monitoring data based upon the requirements.

4.4.4.1.1 Product State Display

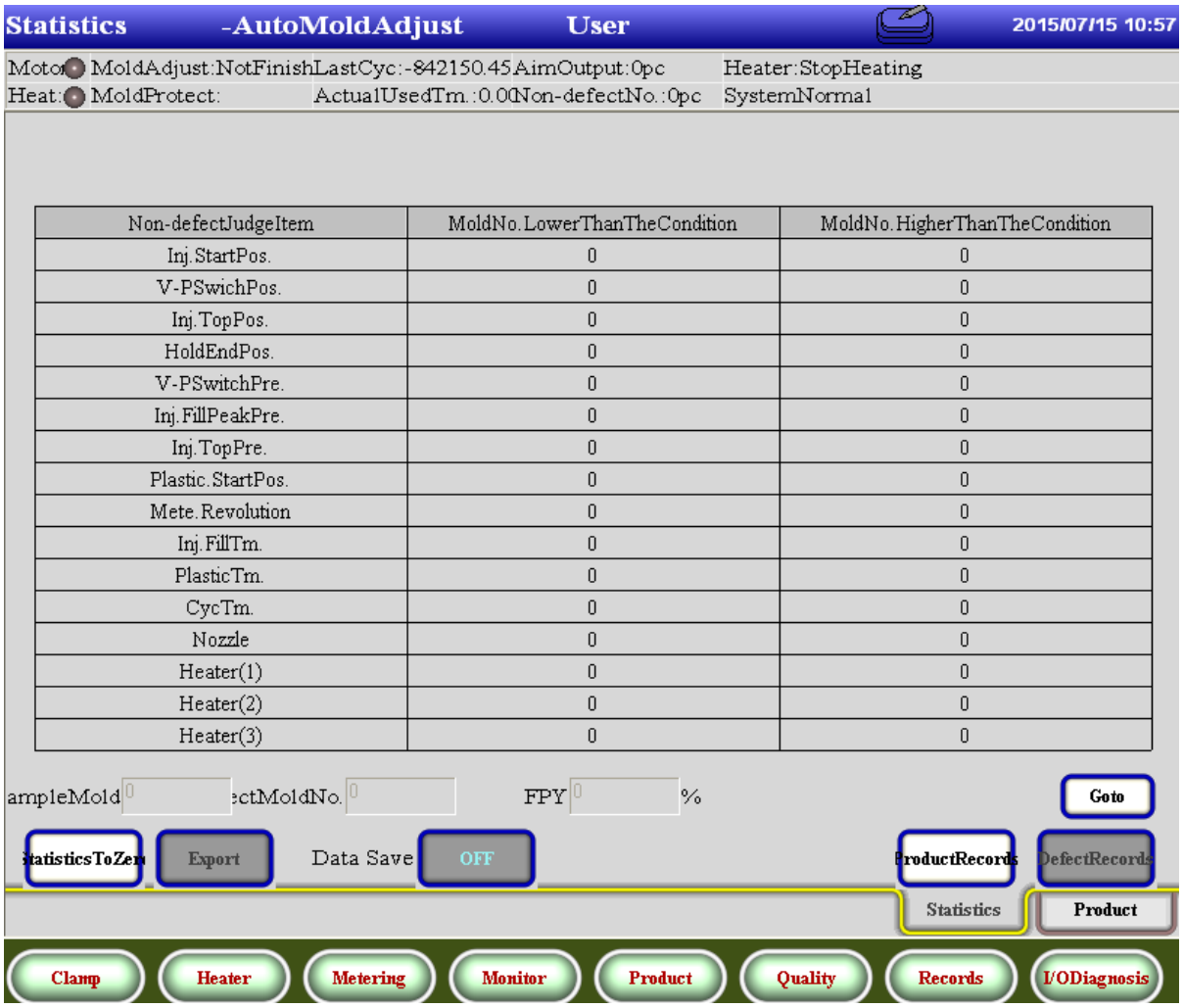
This section displays the product data in the **[FULL-AUTOMATIC]** or **[SEMI-AUTOMATIC]** state, which includes 3 states for the product: sample mold number (**[SampleMold]**),quality product mold number (**[Non-DefectMoldNo.]**) and qualified rate (**[FPY**]).

4.4.4.1.2 Production Record & Statistic Value Zeroing

The overall records and statistics will be cleared after controlling the

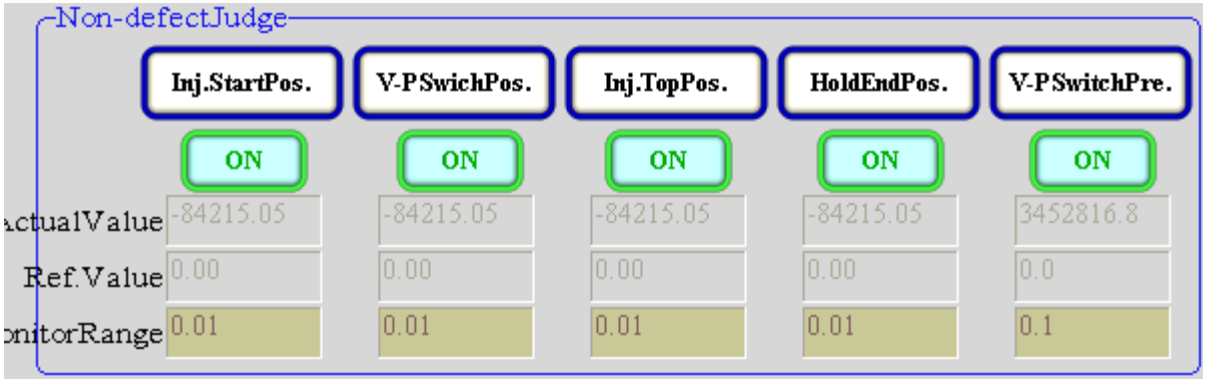
button under the frame; in this case, the records and statistics will be performed again if system is still in the **[FULL-AUTOMATIC]** or **[SEMI-AUTOMATIC]** state.

4.4.4.2 Display of Inferior Record



This page displays the inferior(defect) record statistics;

Select the data to be monitored in the column of the **[Non-defectJudge]** on the page of the **[Quality]**, as the following figure shows. The selected data will be displayed within the above-mentioned page; there is no data change without being selected data.



4.4.4.2.1 Product State Display

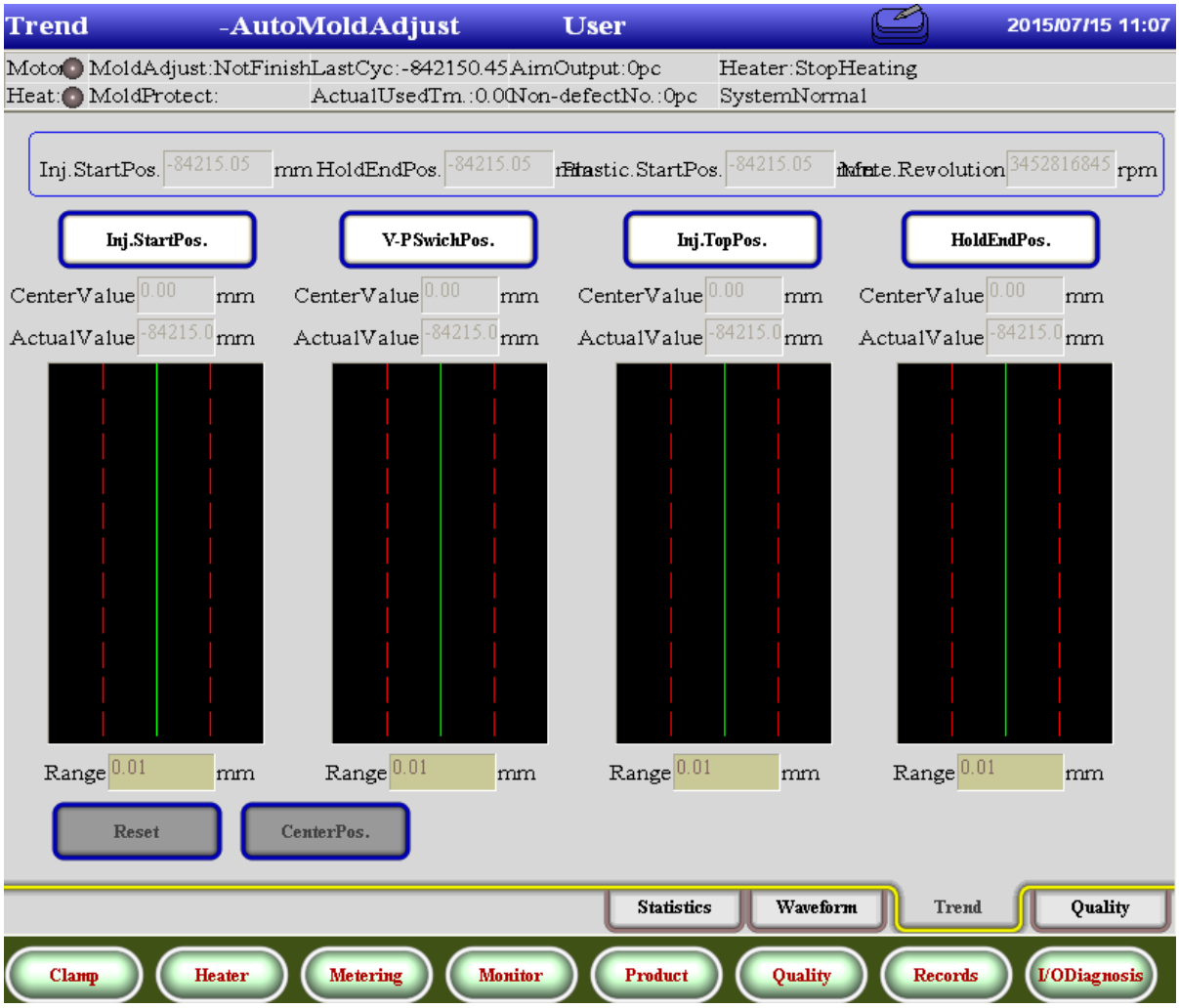
This part displays product data in **[FULL-AUTOMATIC]** or **[SEMI-AUTOATIC]** state. Which includes 3 states for the product: sample mold number (**[SampleMold]**), quality product mold number (**[Non-DefectMoldNo.]**) and qualified rate (**[FPY**]).

4.4.4.2.2 Statistics to zero

Press down

button at the bottom of the list box, all current records and statistics are cleared up. Record value and statistics in **[FULL-AUTOMATIC]** or **[SEMI-AUTOMATIC]** state are recounted.

4.4.5 Tendency Chart

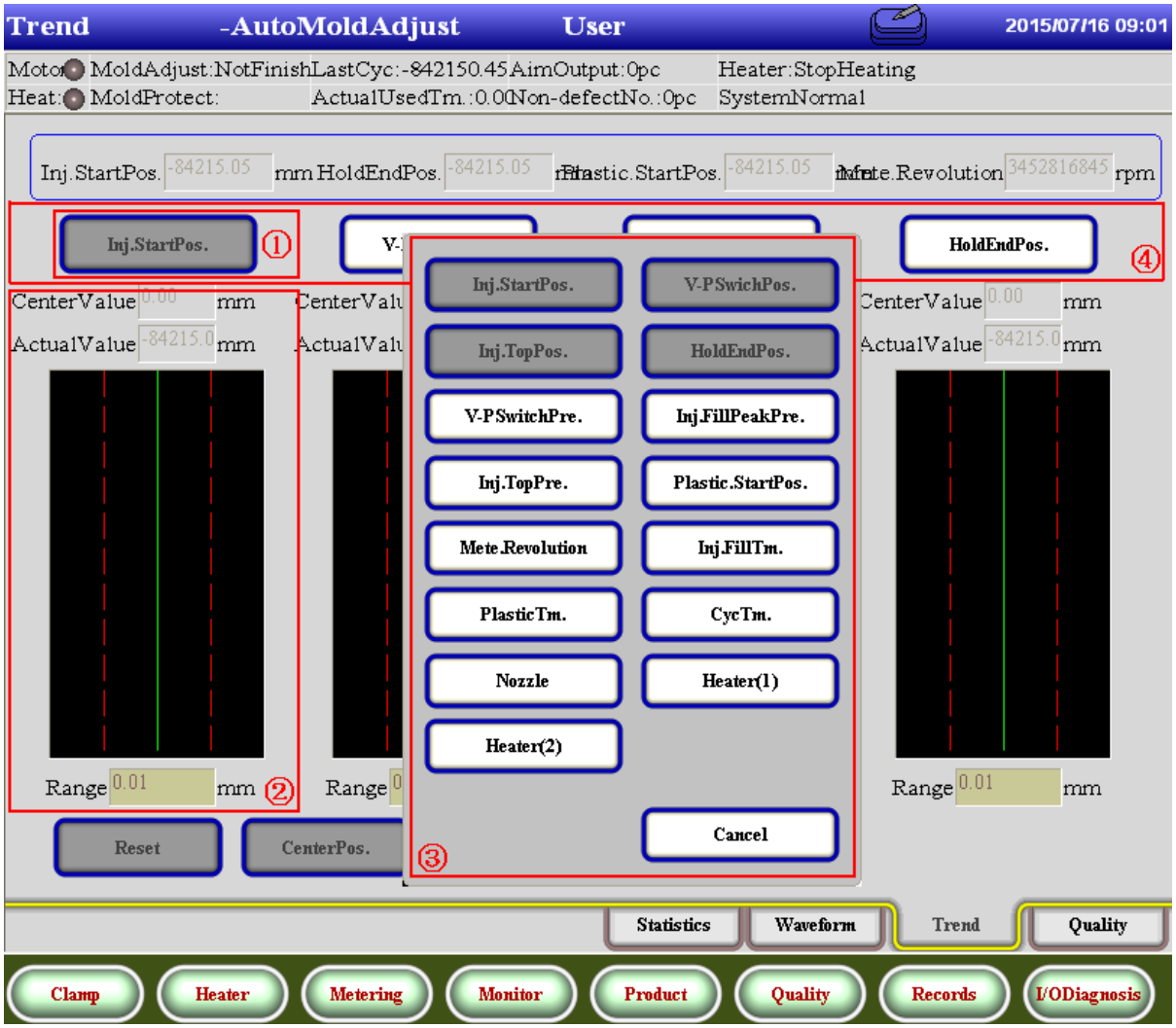


The part displays 15 groups data value of the **[Statistics]** interface based upon the chart form. Four items are displayed at one time, and other 11 items can be selected by data selection box.

When there is no central value set by user, the first recoded data will be defaulted as the

central value. The record is cleared up after resetting; the next record will be set as central value

4.4.5.1 Selection of Data Type



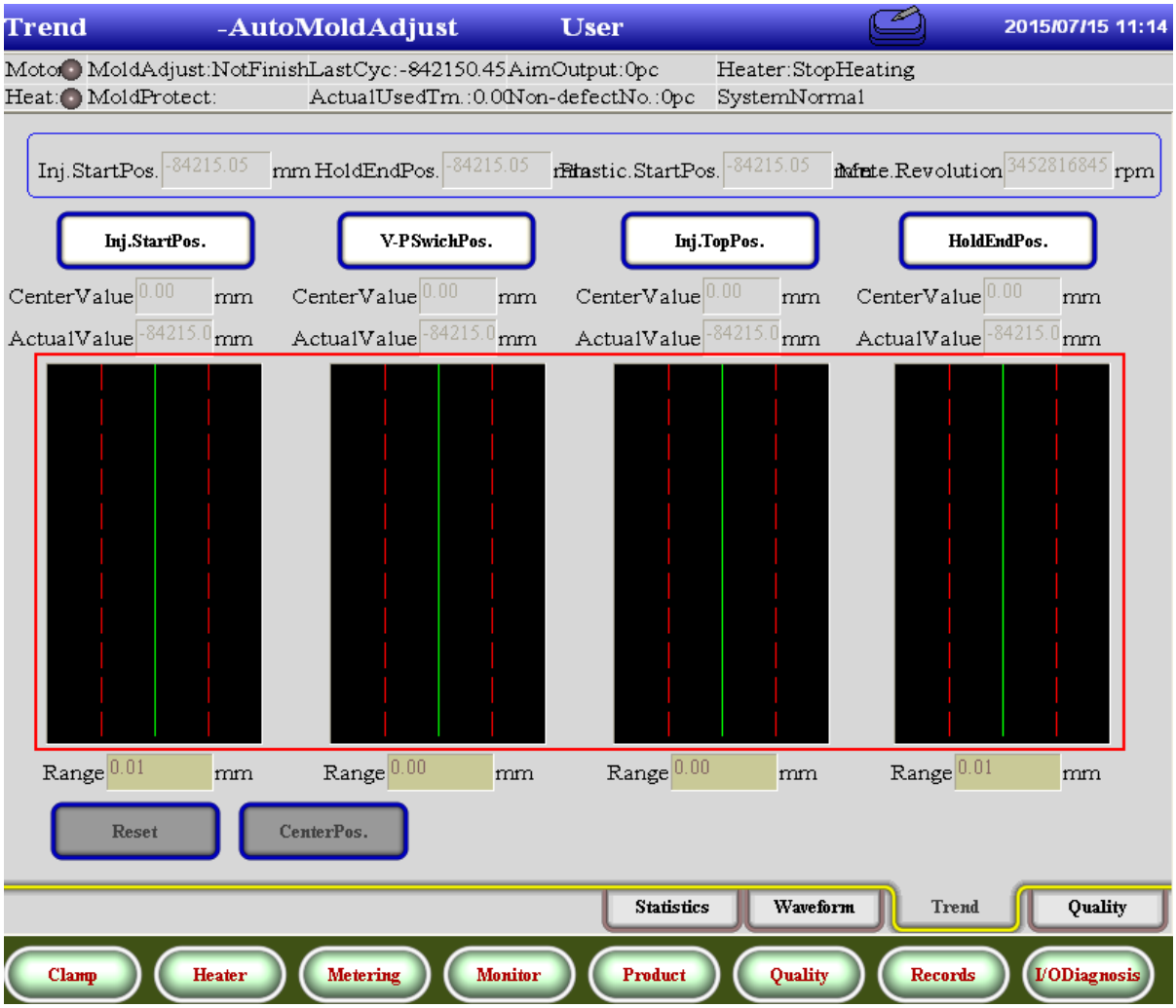
Select the button in the frame ①, the ③ selection frames may occur; Refer to the following description;

If the button within the ① should be changed the data type only needs to click ③ data type button, so that the concerned data can be selected based upon its requirements;

The four buttons in the frame express the displayed data types under the ② frame.

That is, the **[CenterValue]**, **[ActualValue]**, **[Range]** and figure are displayed the data type on the top of the data type button.

4.4.5.2 Tendency Chart Resetting

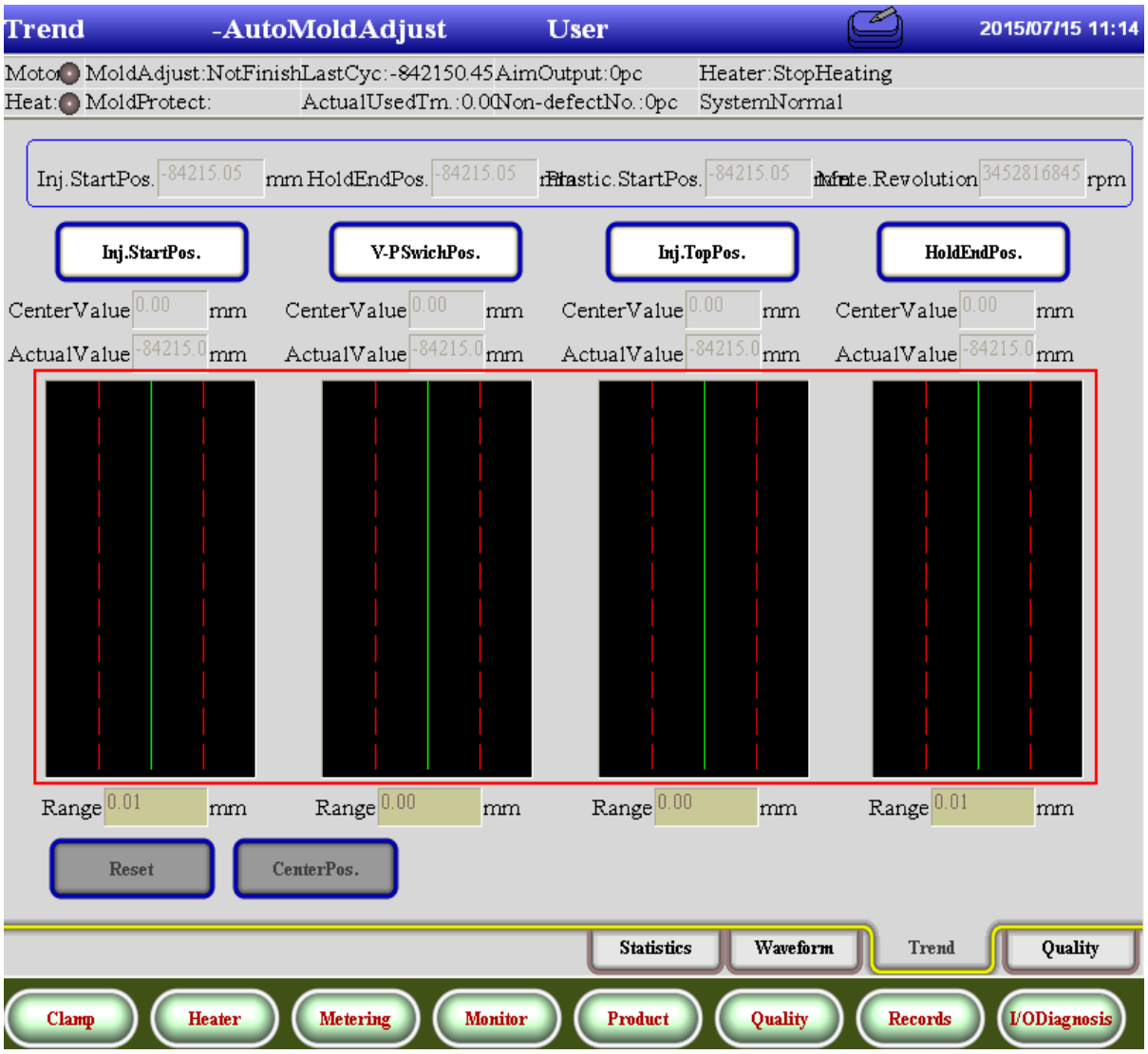


Click any data type button or chart in the red frame in the above-mentioned figure, its corresponding button becomes highlighted, namely, the data type is selected. Click any place beyond data type button or chart in the frame (except the edit frame) to cancel the selection. Specially, select other data type in the situation that a data type already been selected, the selection of the previous one is cancelled, and only one data type can be selected.

After selecting any data type in the red frame, all displays of it can be reset by pressing

button. The button is unavailable if there is no data type selected.

4.4.5.3 [CenterValue] Setting of Tendency Chart



Click button

to set the central value after a data type is selected. Set numerical value of **[ActualValue]** display frame to be central value with **[CenterValue]** button and the chart is made according to the new central value. The button is unavailable if there is no data type selected.

4.4.5.4 [Range] Setting of Tendency Chart

For the tendency chart, click **[Range]** edit frame in the above-mentioned red frame to set amplitude value. Each edit frame corresponds to a group of data type, and the value takes effective immediately after the saving is successful.

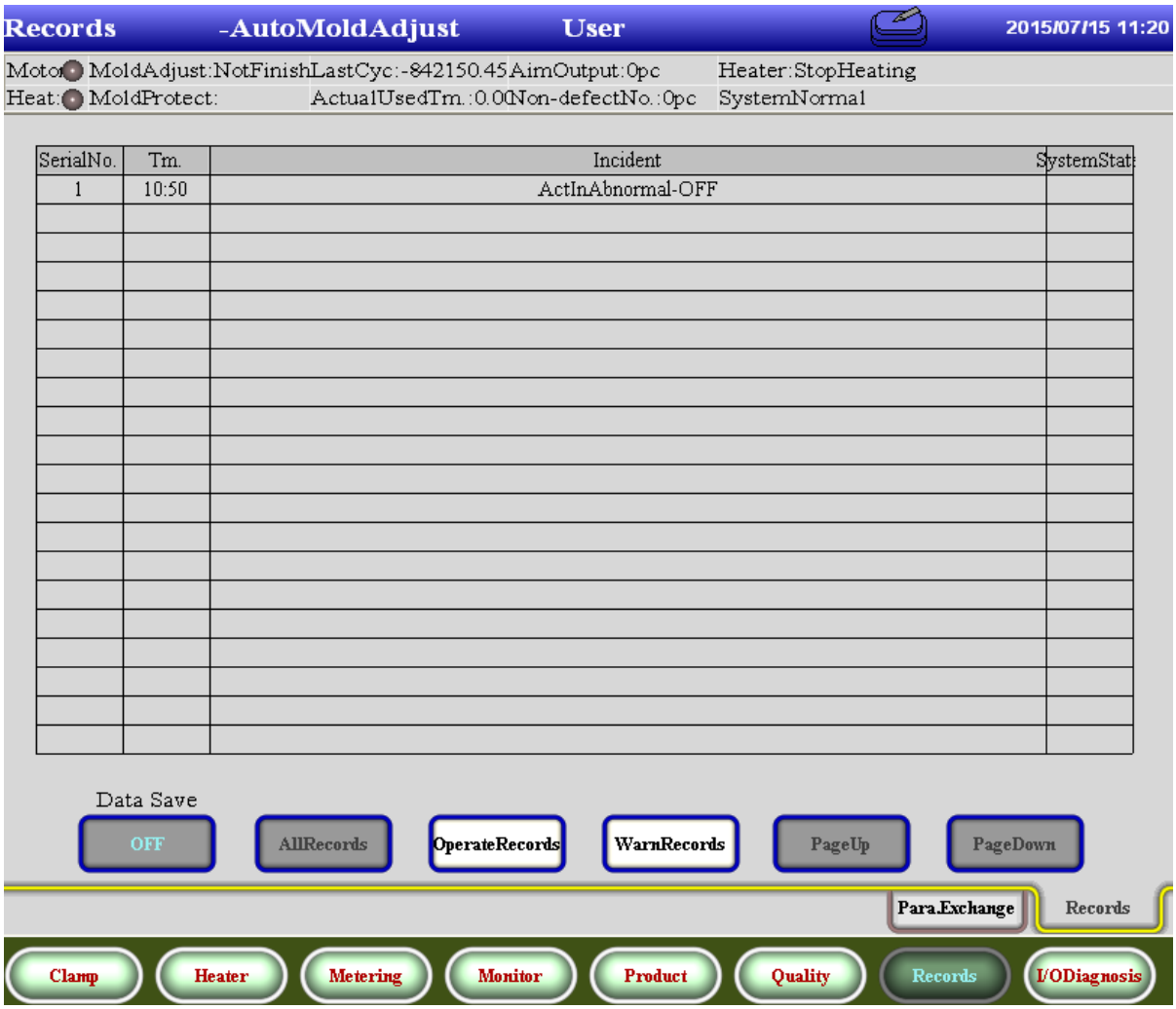
Enter the **[Statistic]** page by controlling the

button.

Enter the **[Quality]** page by controlling the

button.

4.4.6 Historical Records



The interface records all operations (such as parameter modification) and alarms during the operation of the injection molding machine.

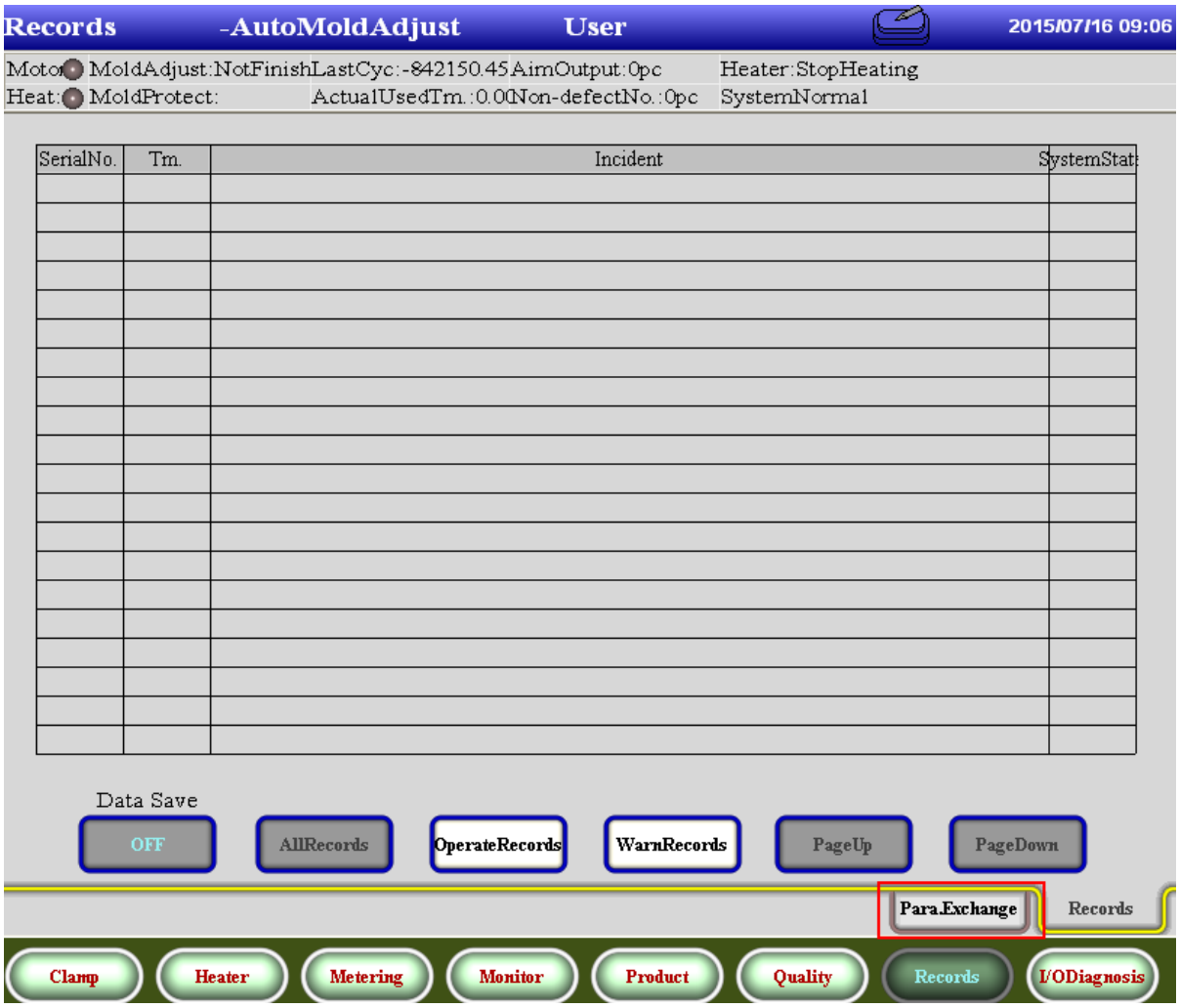
4.4.7 Parameter Exchange

The molding condition save can be saved: Local saving and U-disk saving.

4.4.7.1 Local saving

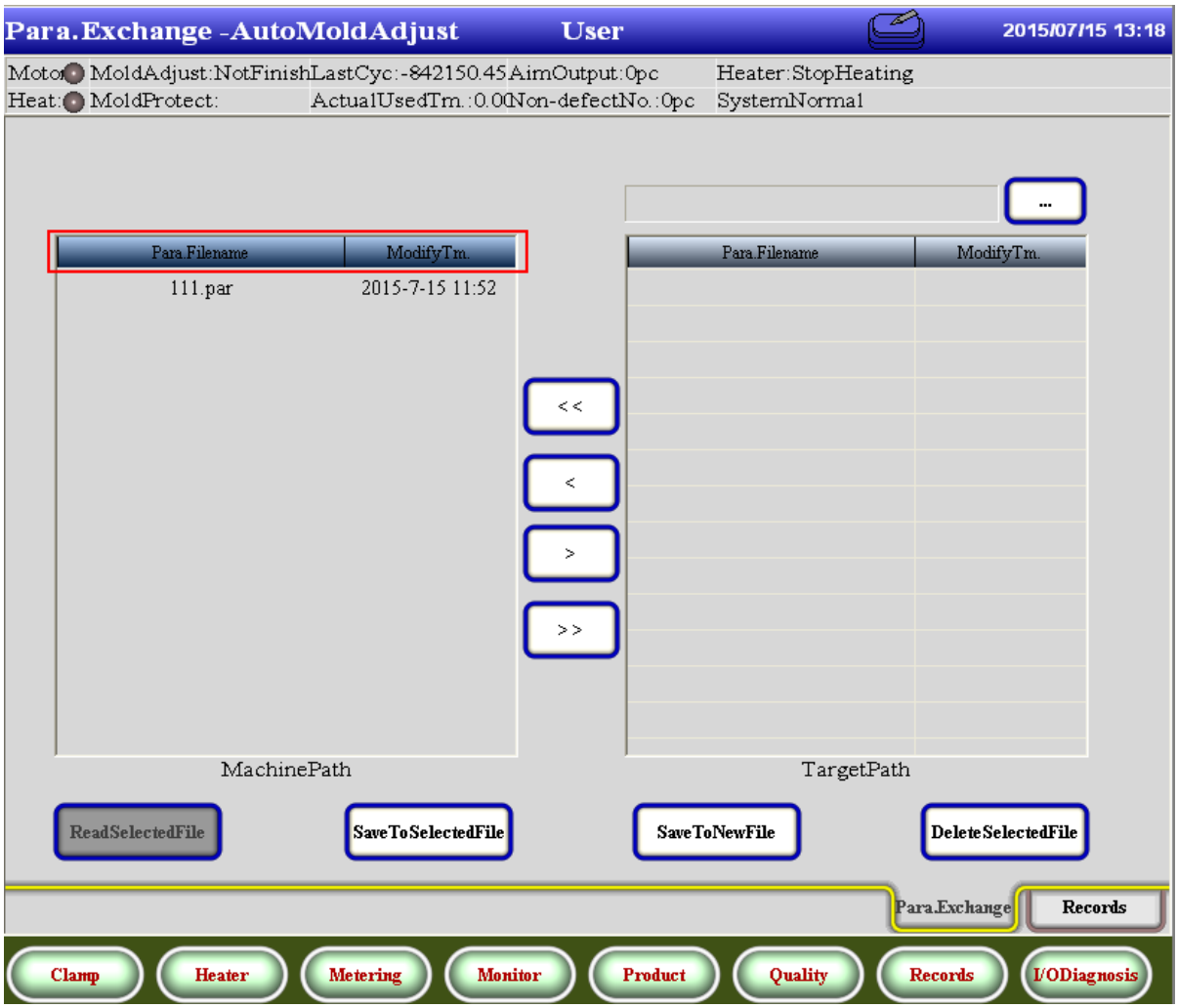
Save the parameter file to the local machine, it is convenient to call the parameter data for machining from the local machine. The local saving operation can be performed based upon the following steps.

Step one: Shift to the **[Records]** interface



Step two: Enter to the parameter exchange interface by

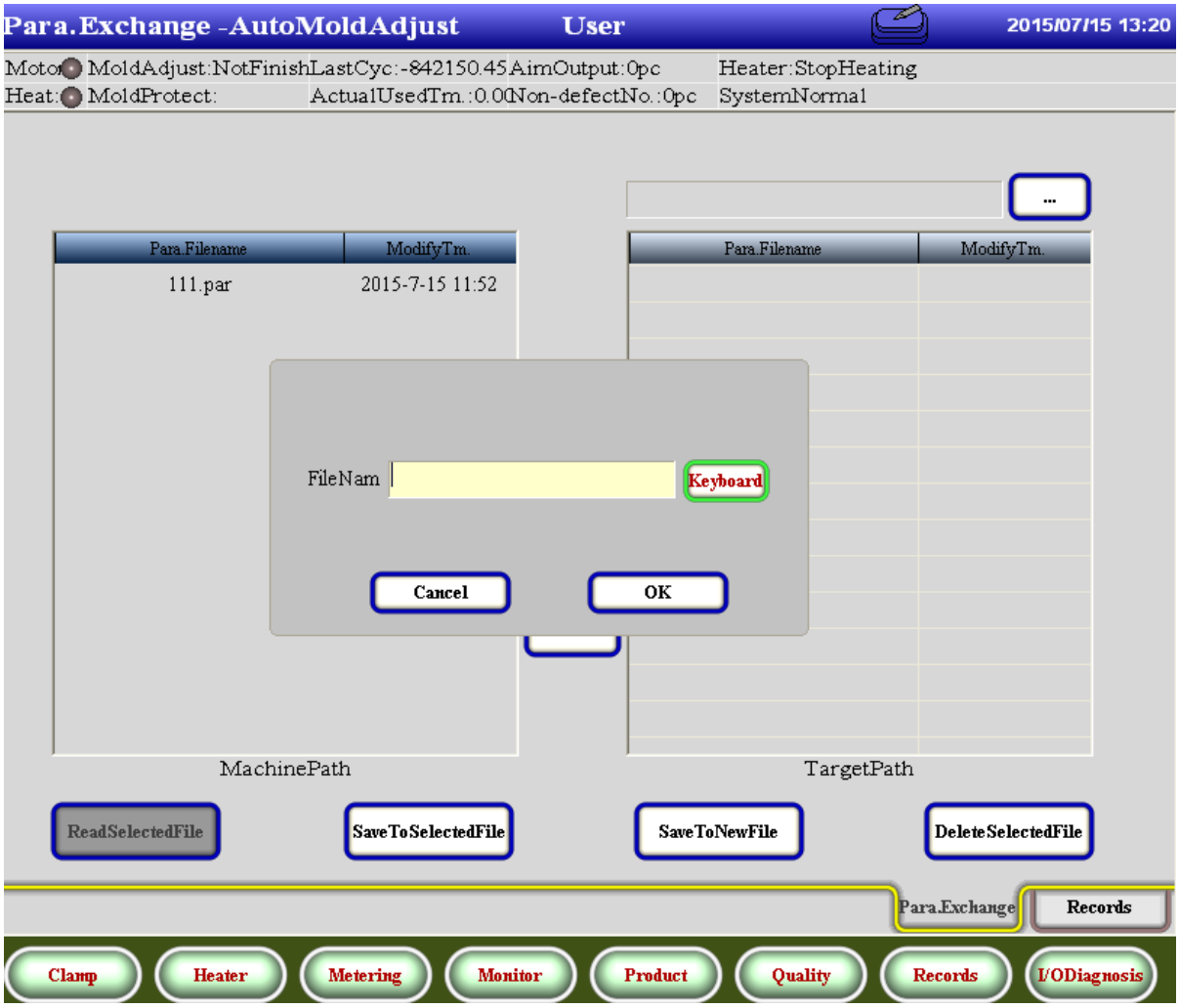
;



Step three: Click the left window on the left of the interface to make it effective, in this case, the title of the window becomes blue; refer to the above-mentioned frame.

Step four: Press the

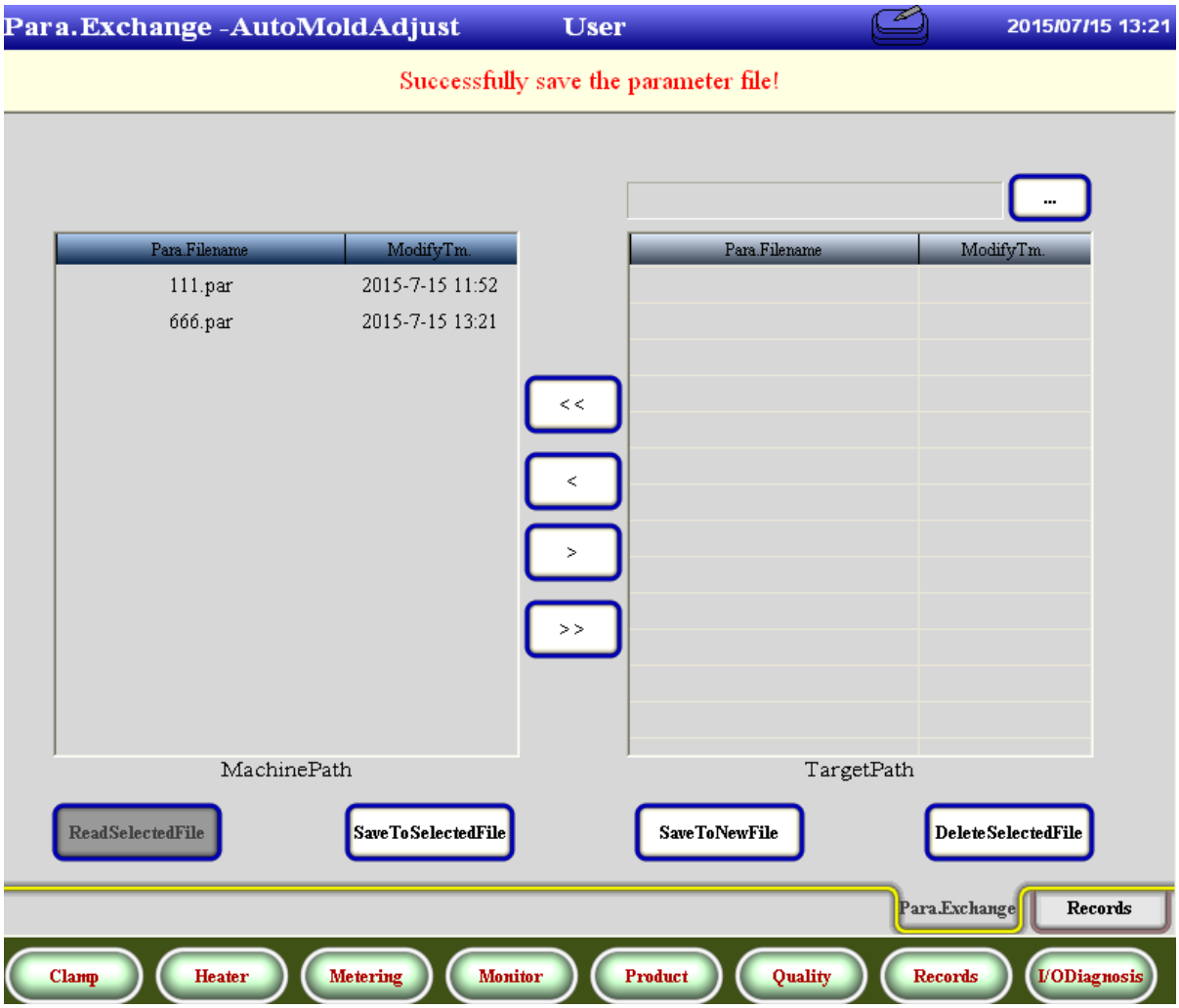
, and then input the file name in the displayed window.



Step five: After inputting the file name, click the [OK] button to create a new file, simultaneously, save the parameter

Prompt

- After parameter file is saved, select this file name and then click the **[SaveToSelectedFile]** button, the interface may be displayed the prompt “Successfully save the parameter file!”.

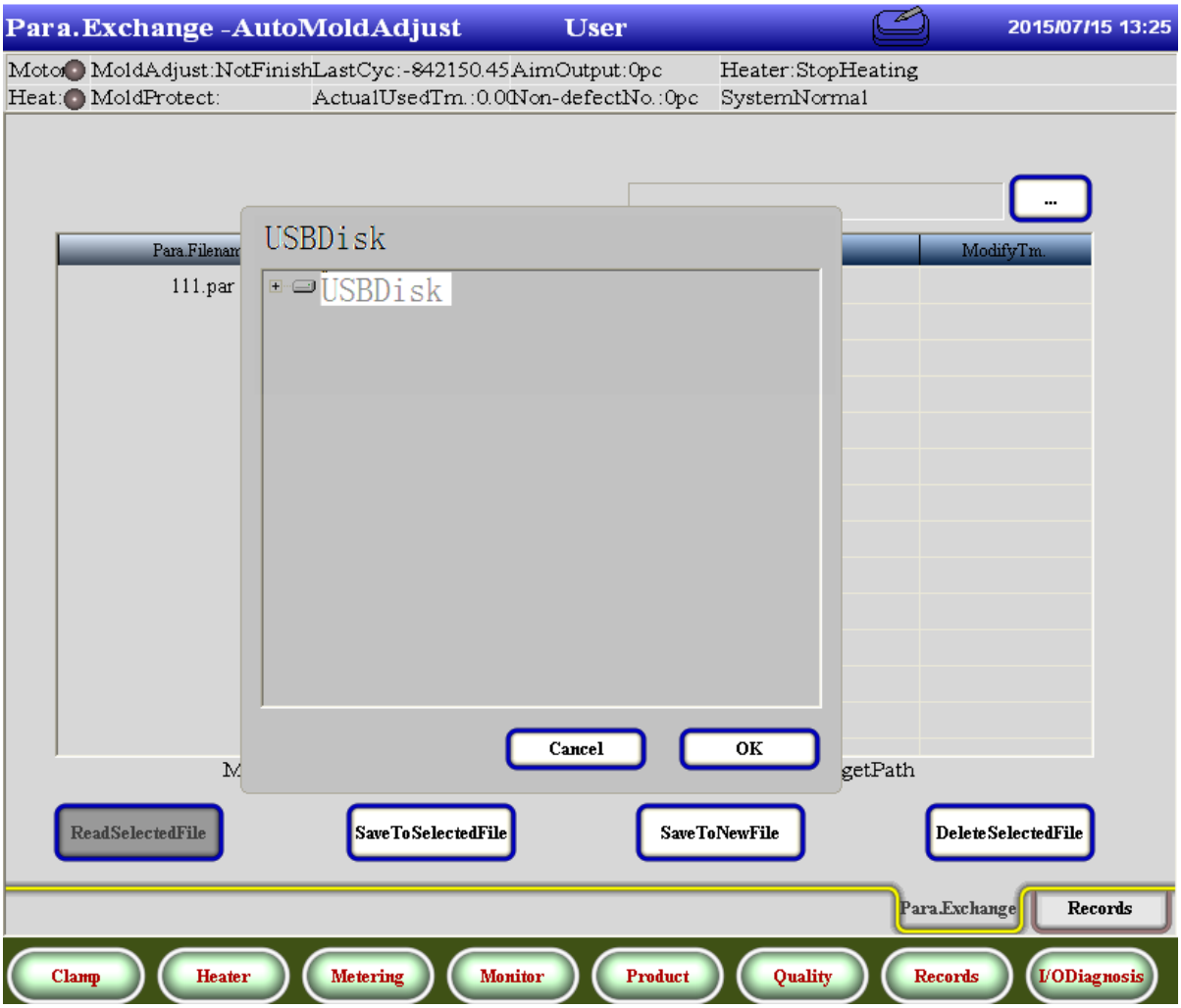


4.4.7.2 U-Disk Save

Save the parameter to the U disk, so that the parameter data can be used by copying to the other controllable systems, as the GSK6000 serial injection molding machine. It is better to perform the U-disk saving operation based upon the following steps. Insert the U disk, and then repeat the above-mentioned 1st and the 2nd steps, then:

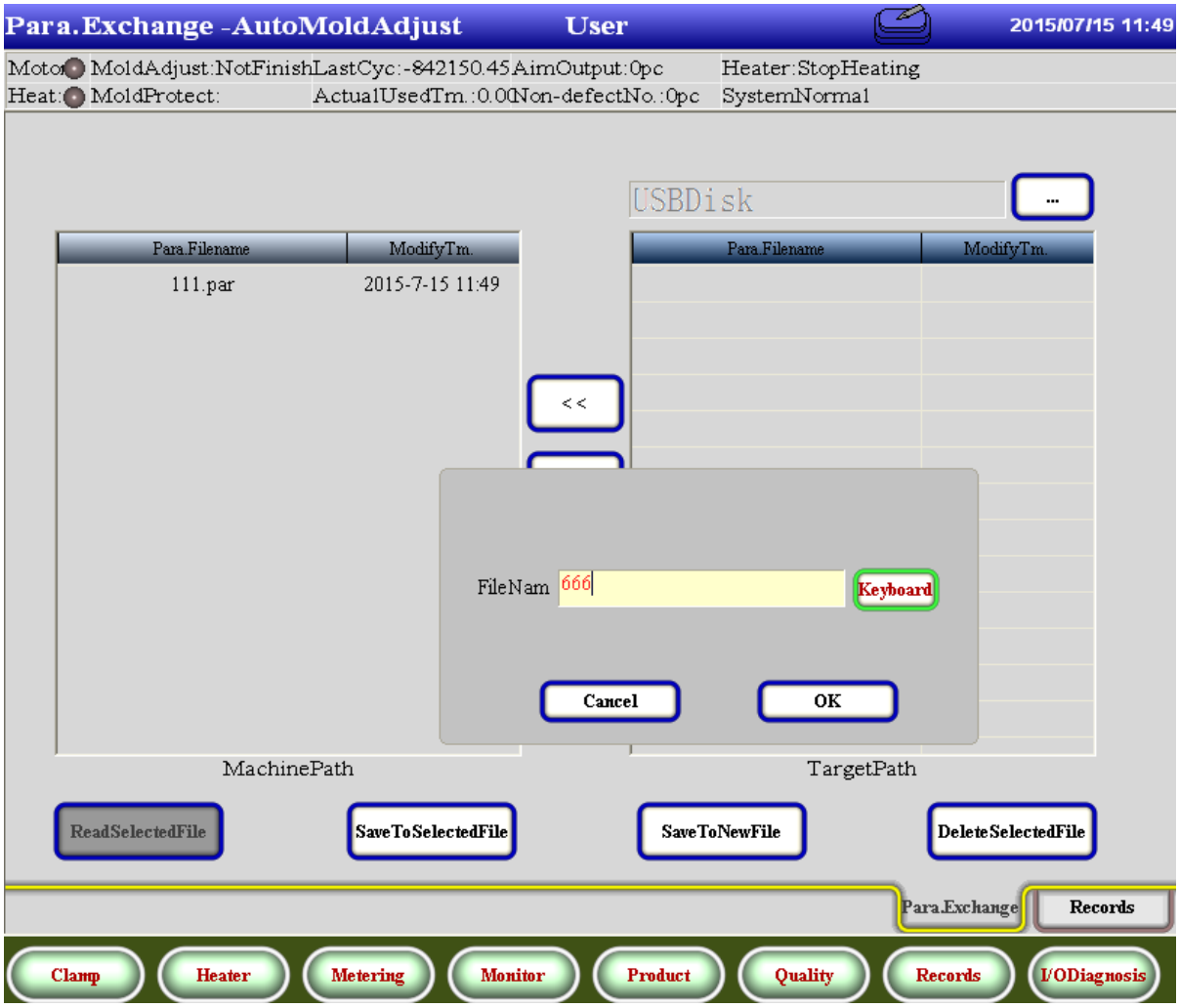
Step three: Select the U disk by pressing the

button, and then enable it at the right window for the right interface; in this case, the window title becomes dark blue;

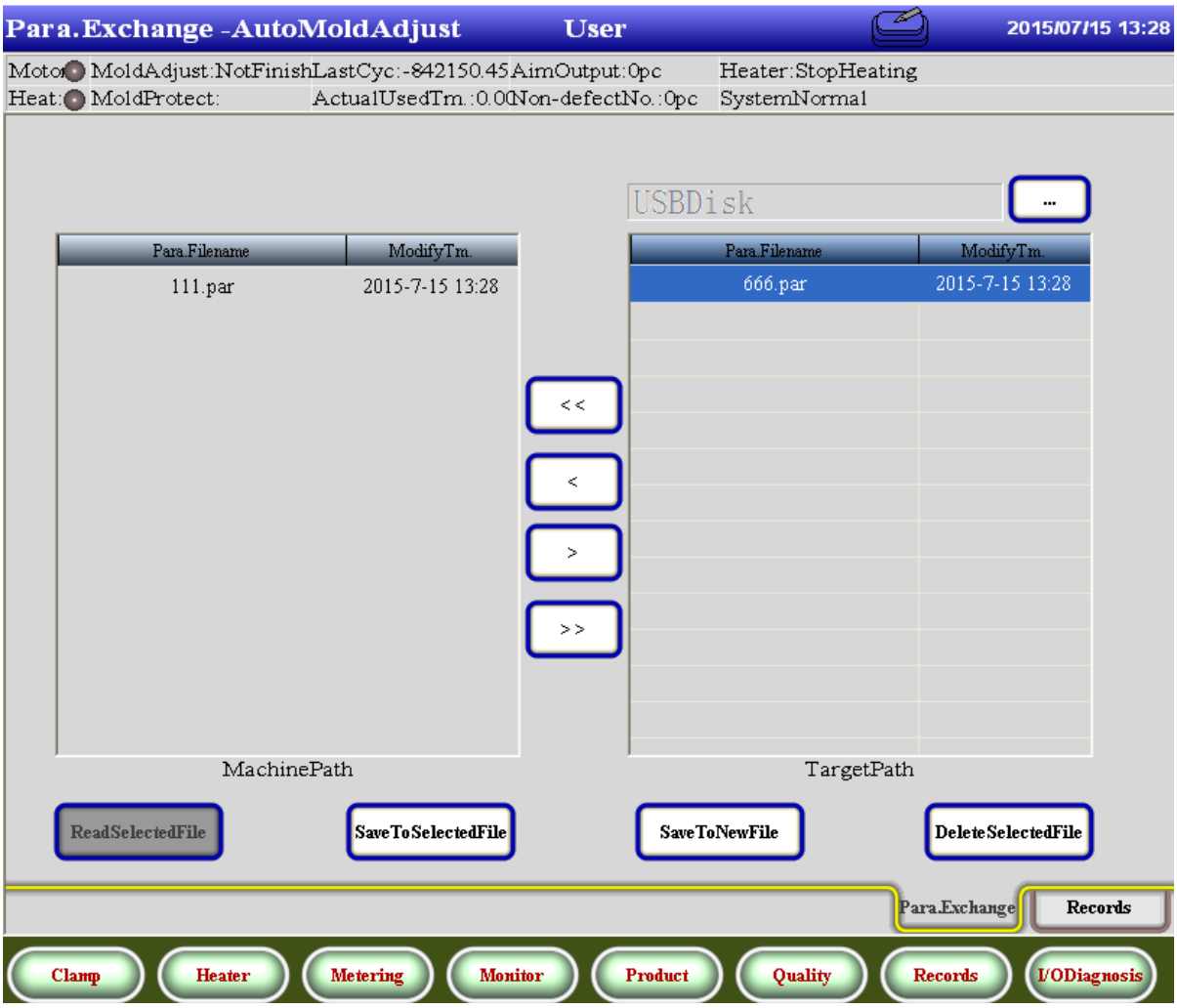


Step four: Click the soft keyboard on the displayed window by

, and then input a file name;

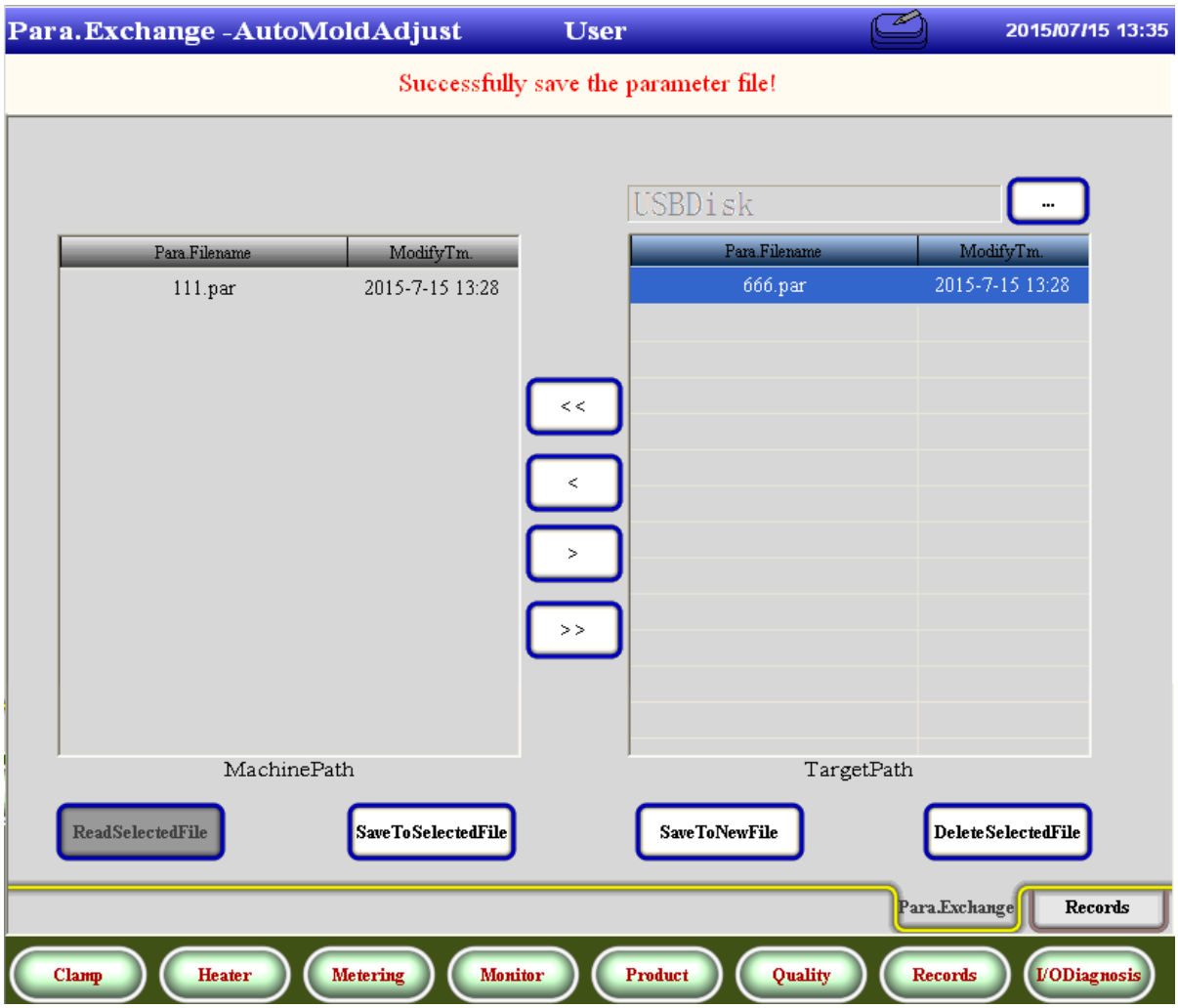


Step five: After a file name is inputted, click [OK] button to create a new file and save it.



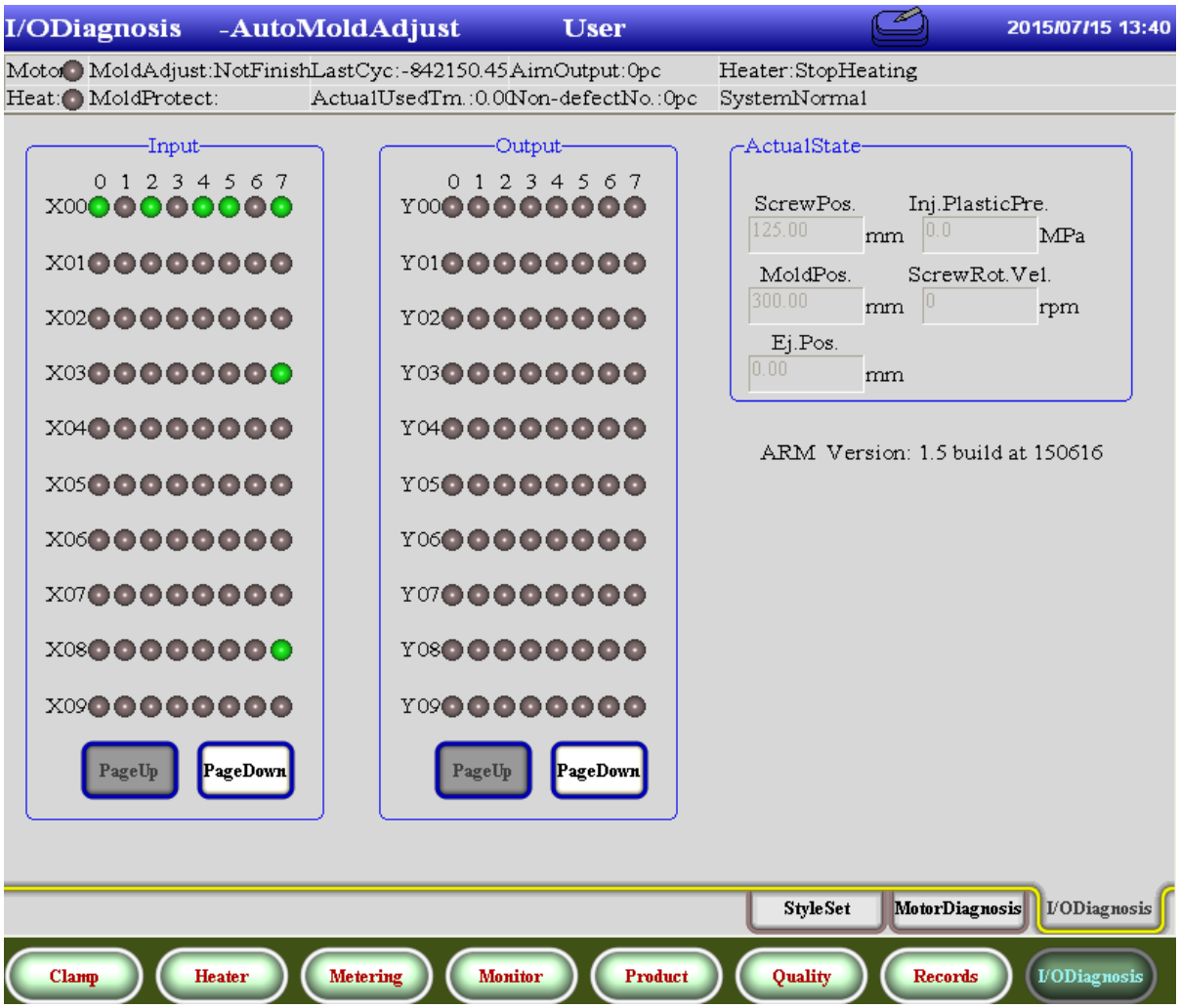
Prompt

- After the parameter file name is saved, firstly select this file name and then click the **[SaveToSelectedFile]** button, the prompt “Successfully save the parameter file!” may occur on the interface.
- Some U disks may not be identified on the system because there are some many factories to manufacture the U-disk; but it is not expressed that the system or U-disk is disabled if this case occurs; it is better to change the U-disk and then try again.



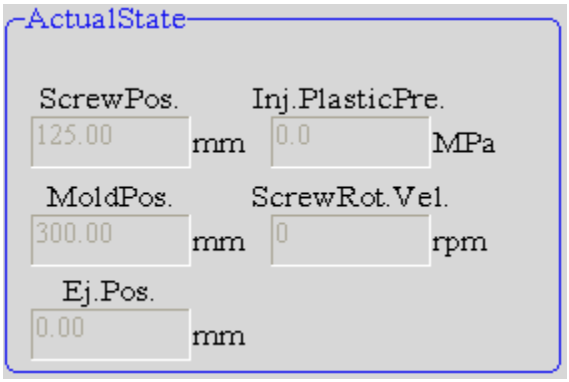
4.5 Input/Output State Monitoring

4.5.1 I/O Diagnosis



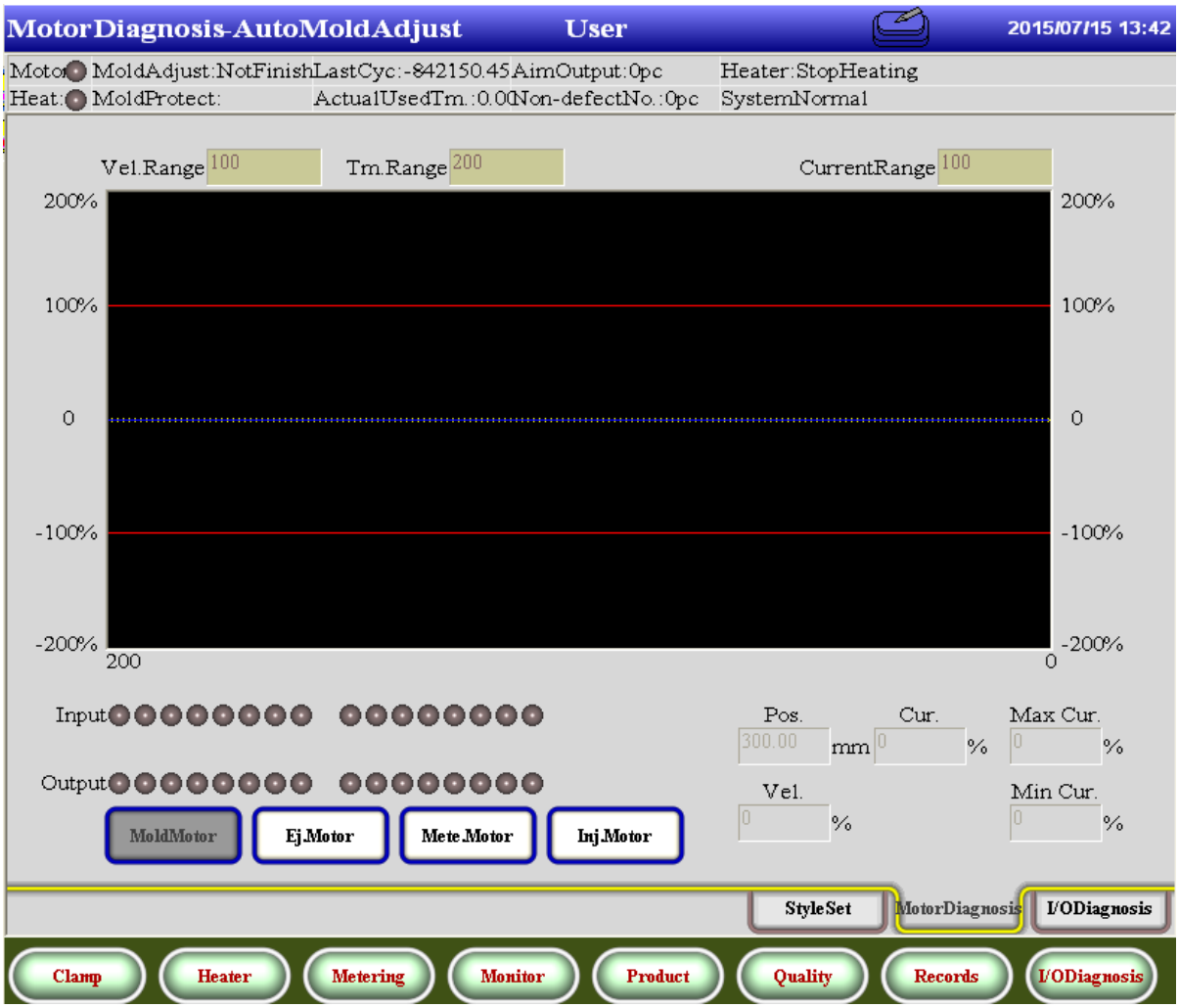
[I/ODiagnosis] interface is responsible for displaying the I/O state of the injection molding machine, which have the input I/O, 80 pieces of each page, 160 pieces for two pages; the output I/O does so; The I/O indicator becomes black when the I/O port does not respond; The I/O indicator becomes green when the I/O port responds.

The current state displays the important information relevant to the machining; it is convenient for the user to understand the actual position or other data when observing the I/O state.



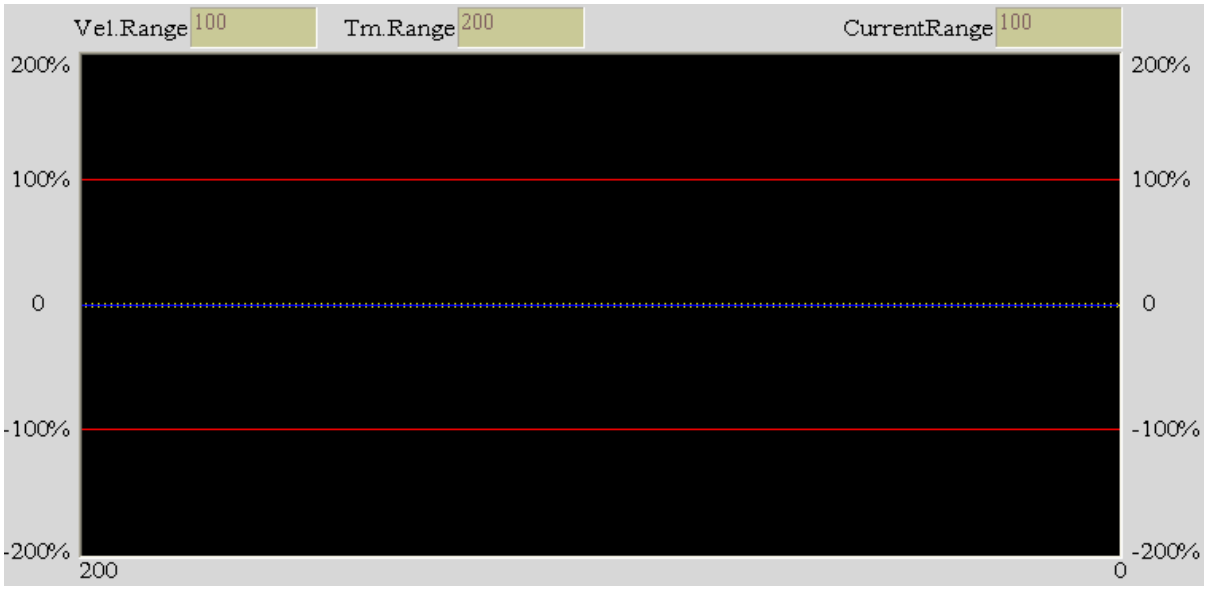
There are 5 actual positions or data in this window can be viewed: **[ScrewPos.]**, **[Inj.PlasticPre.]**, **[MoldPos.]**, **[ScrewRot.Vel.]** and **[Ej.Pos.]**.

4.5.2 Motor Diagonsis



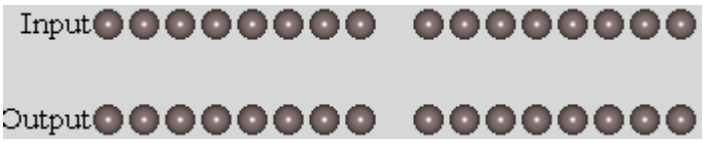
[MotorDisgnosis] interface is responsible for displaying and tracing the relevant state of the motor.

4.5.2.1 Graph Display



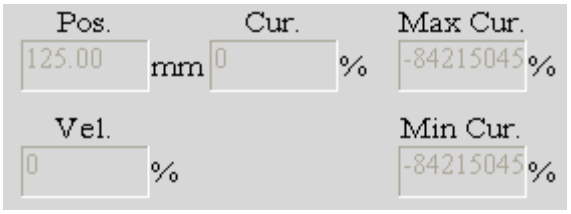
The part displays the velocity, current of the motor in operation, which is displayed in the form of amplitude. Amplitude of time, velocity and current can be set by input boxes at the top of the interface.

4.5.2.2 Motor I/O Display

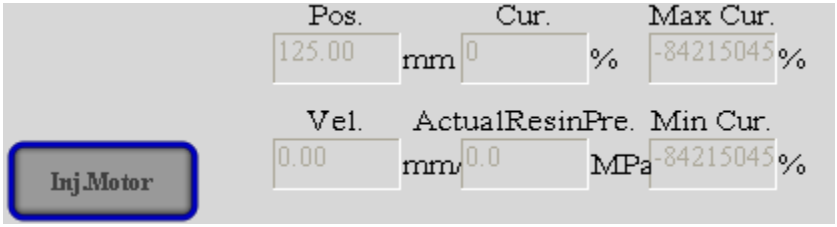


This part displays I/O state of the motor. When the I/O does not respond, its indicator is black and gray . When the I/O has response, its indicator is green .

4.5.2.3 Motor's Current State



This part displays the current position (**[Pos.]**), current (**[Cur.]**) and velocity (**[Vel.]**) of the motor, as well record the Min. and the Max. current value for the motor within a period.



The injection motor option is also display the resin pressure within the current charging

barrel ([ActualResinPre.]).

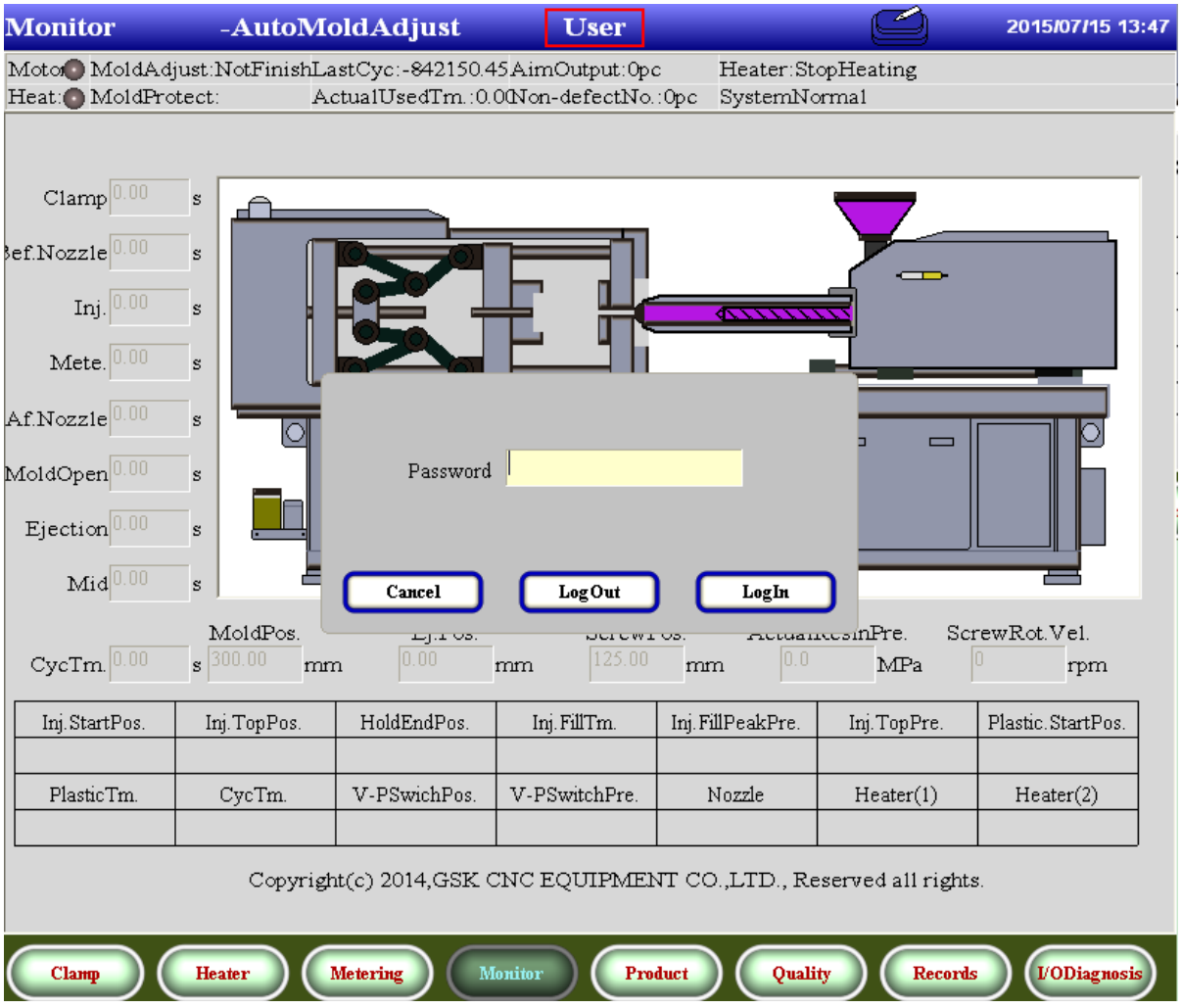
4.5.2.4 Motor Selection

These buttons are used to select the motor to be detected and tracked. The button turns gray-black when the motor is selected. If not, it turns white.

4.5.1 Logging-in Setting

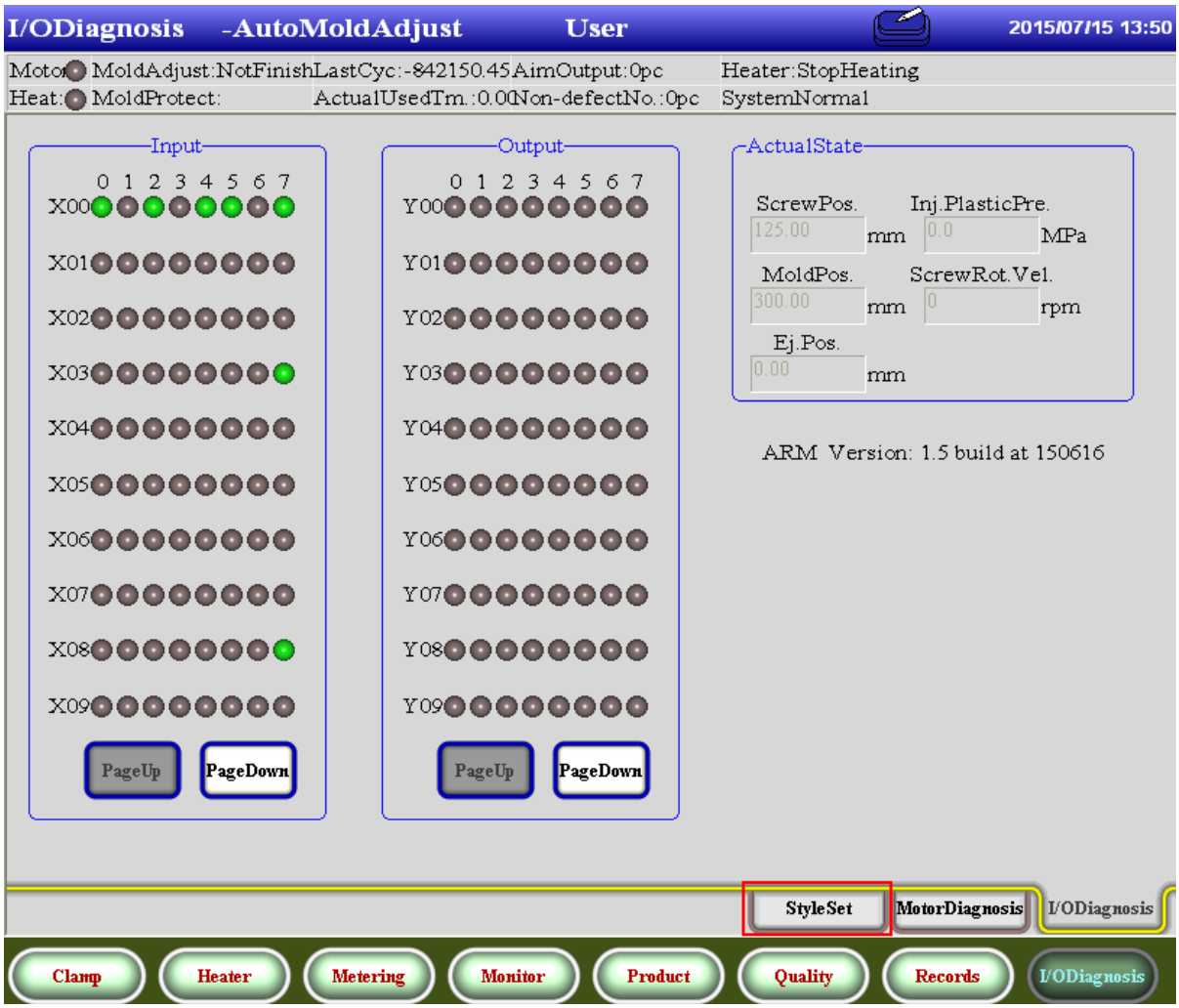
There are two methods for changing the user authority:

① Click the current user grade marked at the middle of the top, the login frame may occur, refer to the following figure:

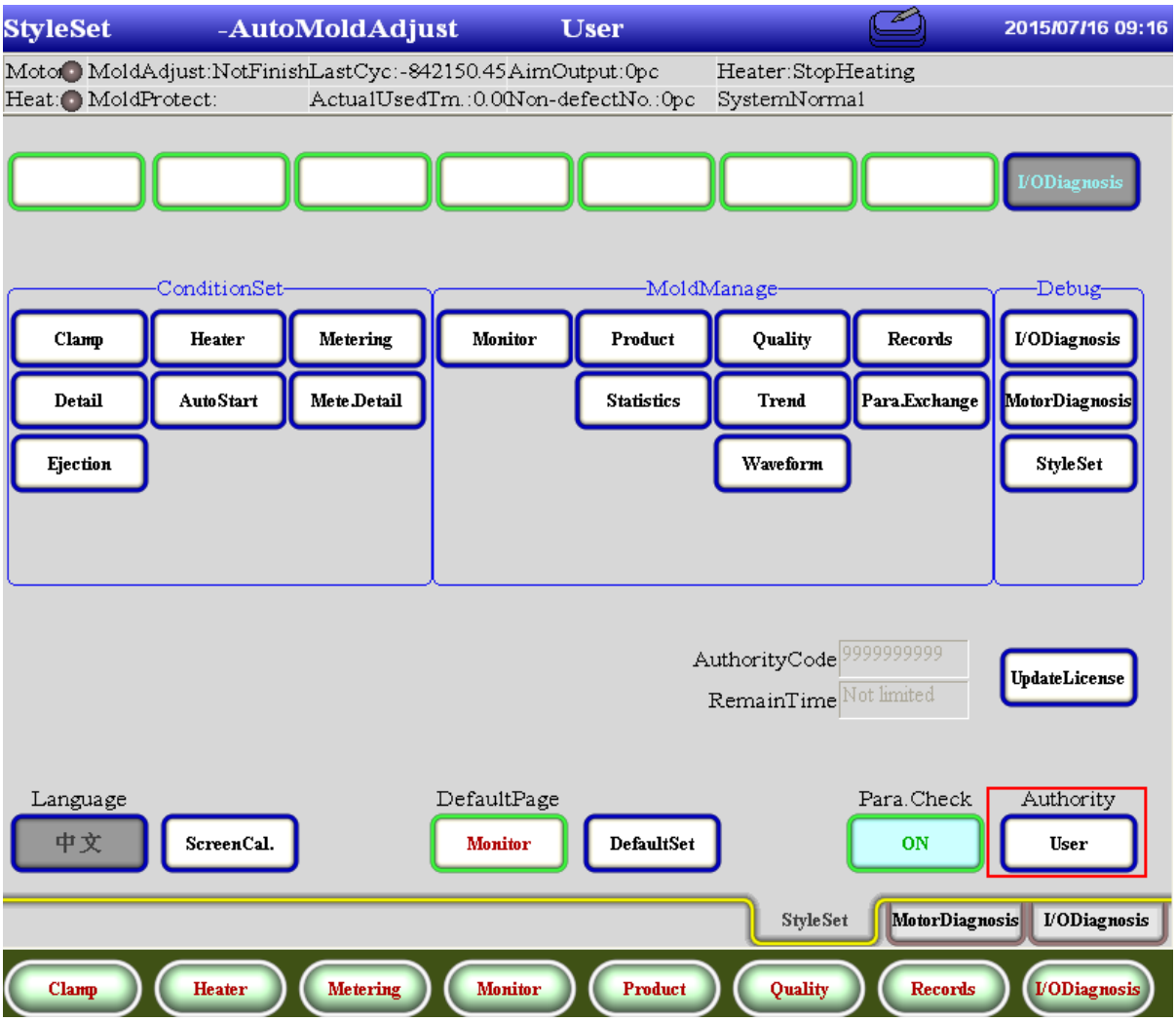


The corresponding user can be entered after inputting the password.

② Shift to the **[I/ODiagnosis]** interface

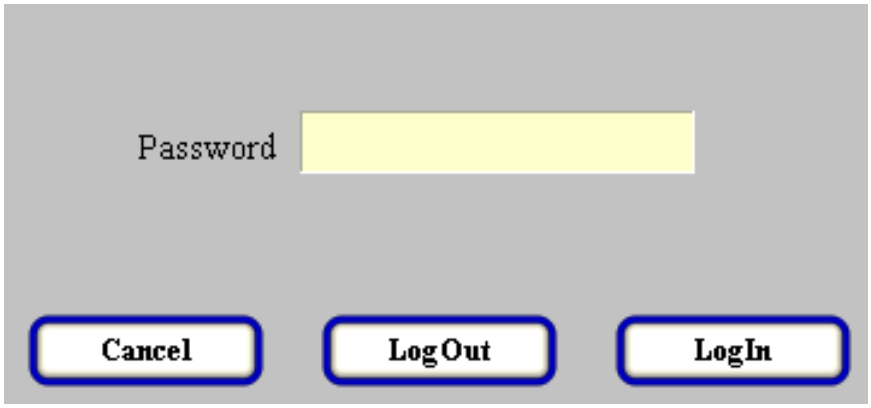


The **[StyleSet]** button shows; enter to this page by the button.



The login window shows by clicking the

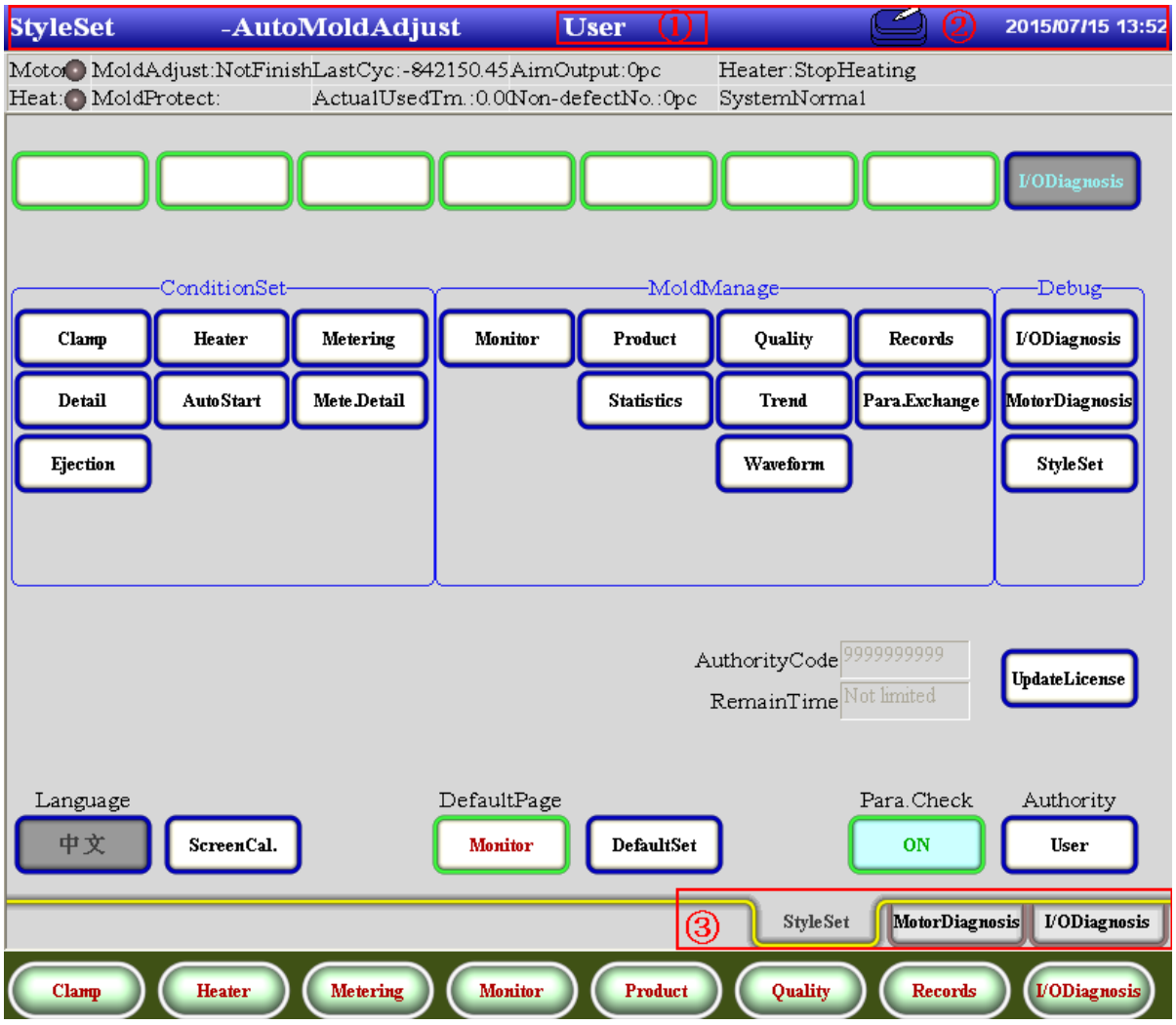
button:

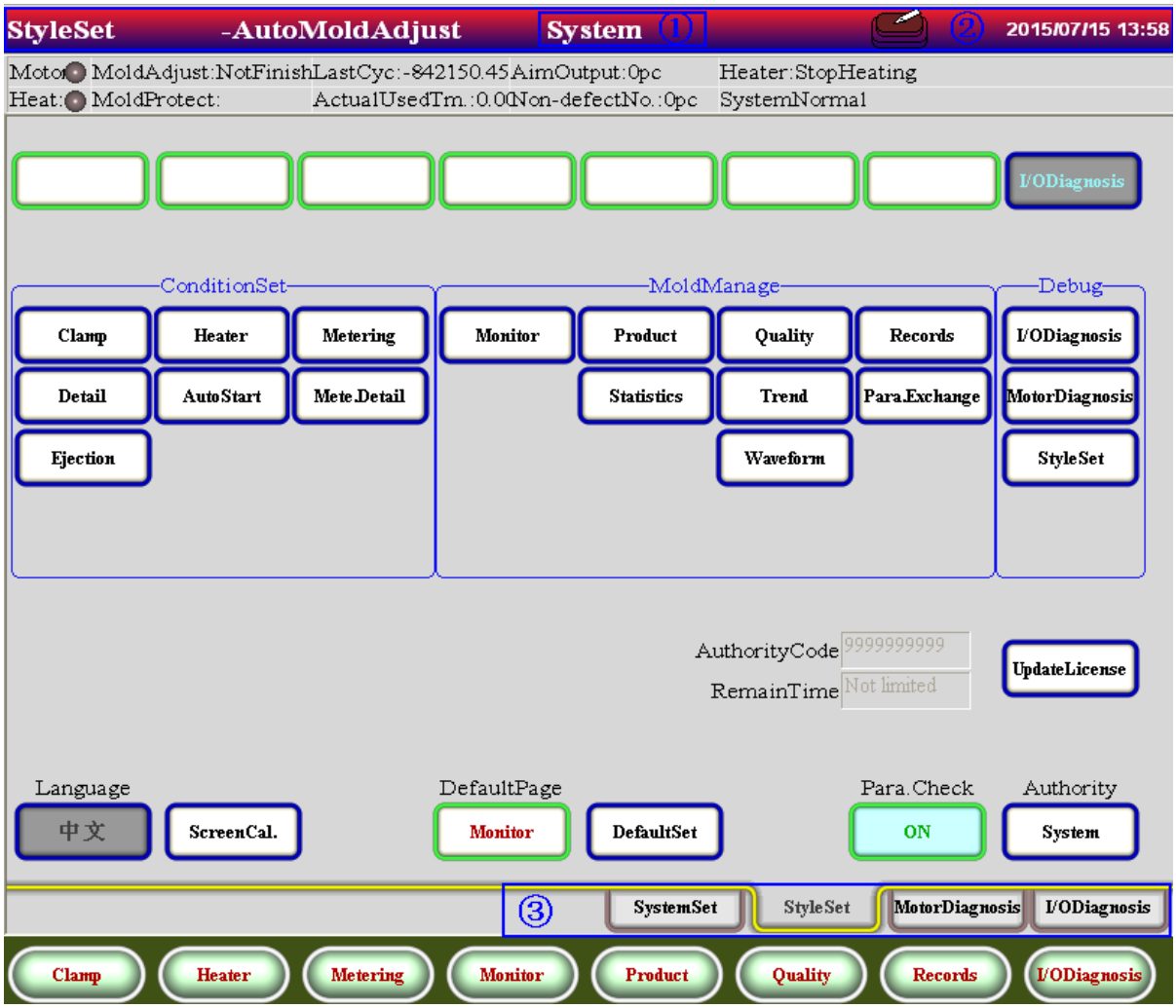


Input the system administrator password to login it, in this case, the difference displays before logging in and after logging in.

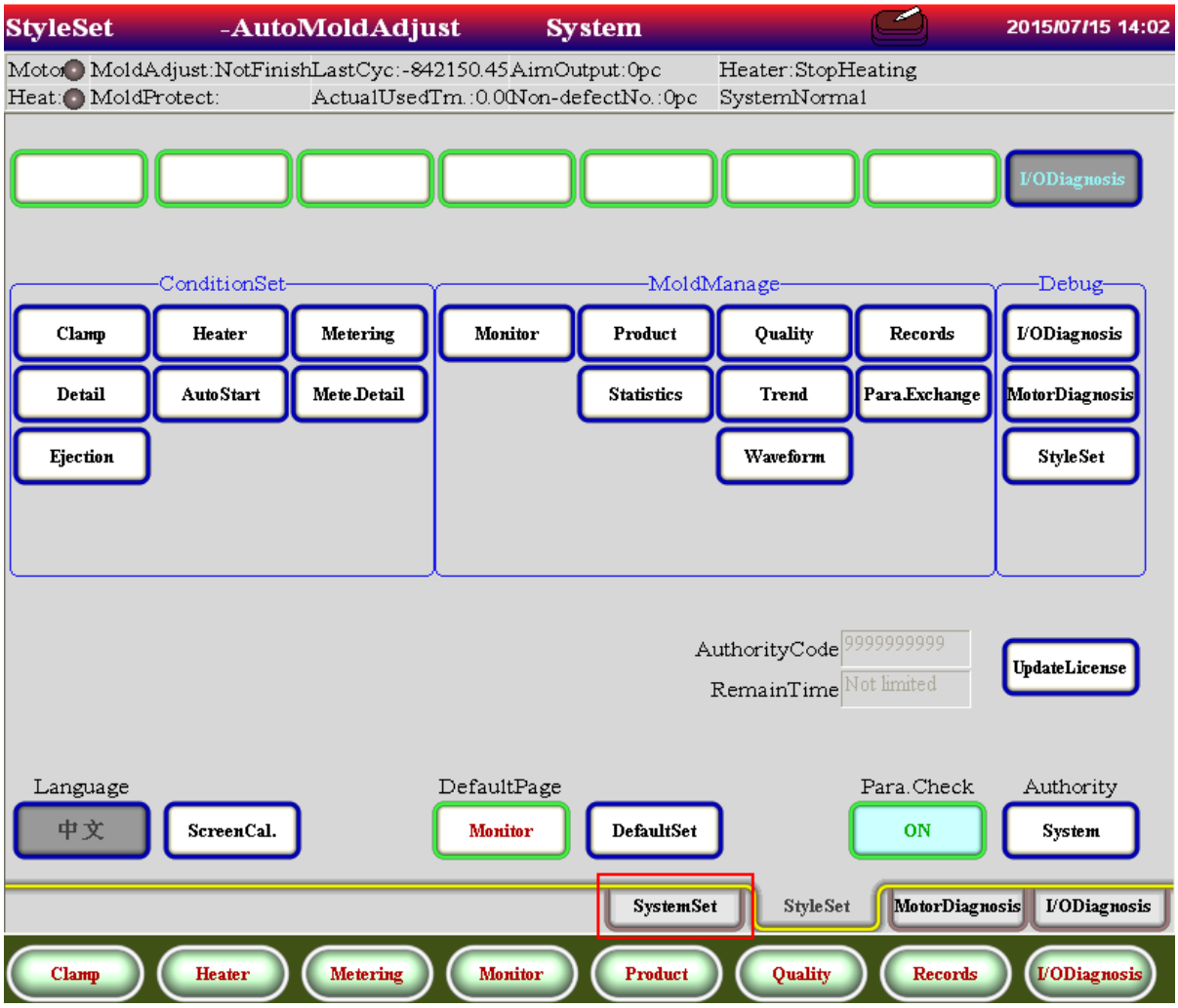
We can find:①: authority state different; ②: different color; ③: several buttons shown after logging in.

Refer to the following figure:

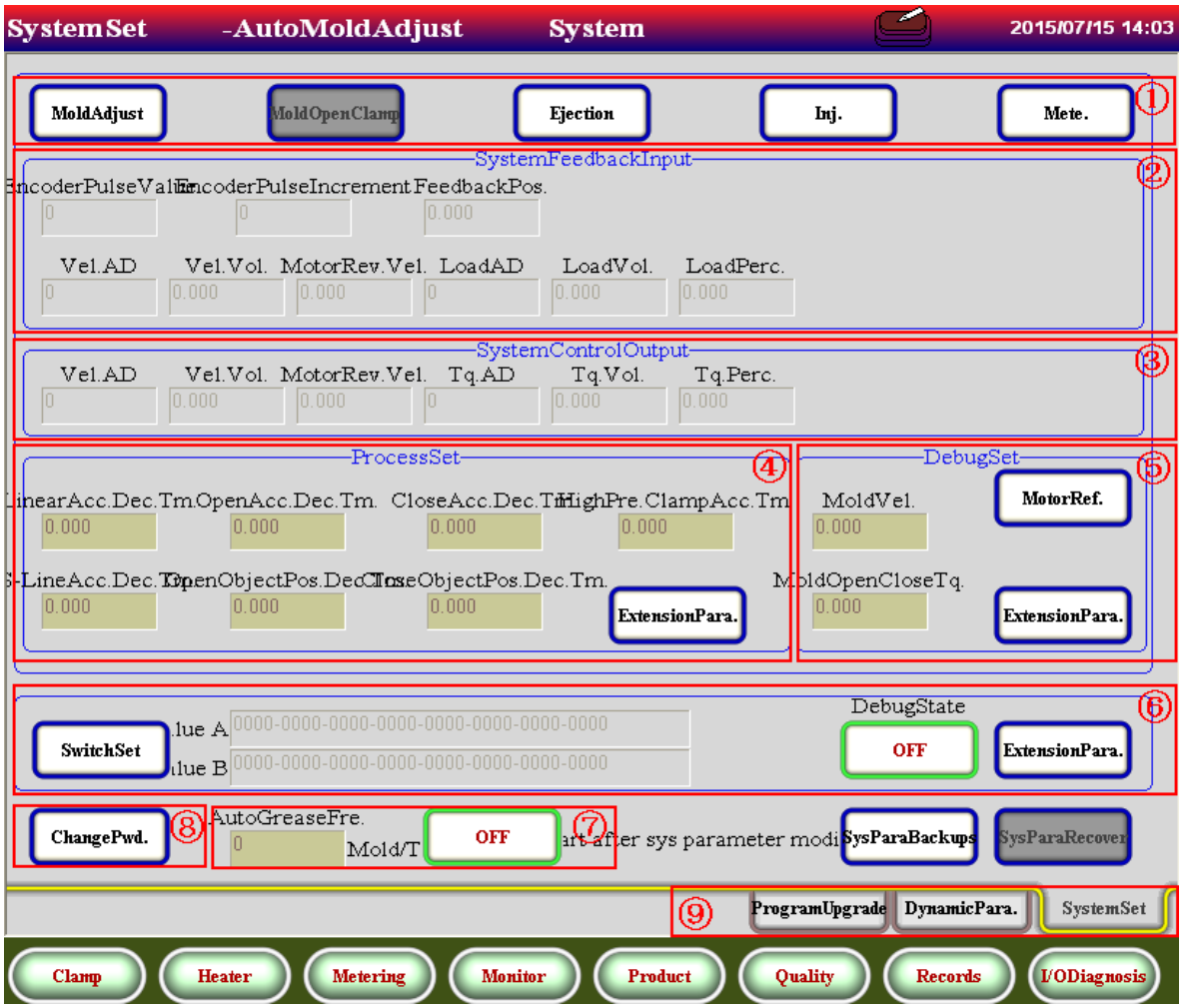

StyleSet
-AutoMoldAdjust
User
①
②
2015/07/15 13:52
Motor
MoldAdjust:NotFinishLastCyc:-842150.45AimOutput:0pc
Heater:StopHeating
Heat:
MoldProtect:
ActualUsedTm.:0.00Non-defectNo.:0pc
SystemNormal
I/ODiagnosis
ConditionSet
MoldManage
Debug
Clamp
Heater
Metering
Monitor
Product
Quality
Records
I/ODiagnosis
Detail
AutoStart
Mete.Detail
Statistics
Trend
Para.Exchange
MotorDiagnosis
Ejection
Waveform
StyleSet
AuthorityCode
9999999999
RemainTime
Not limited
UpdateLicense
Language
DefaultPage
Para.Check
Authority
中文
ScreenCal.
Monitor
DefaultSet
ON
User
③
StyleSet
MotorDiagnosis
I/ODiagnosis
Clamp
Heater
Metering
Monitor
Product
Quality
Records
I/ODiagnosis


StyleSet
-AutoMoldAdjust
System ①
②
2015/07/15 13:58
Motor MoldAdjust:NotFinishLastCyc:-842150.45AimOutput:0pc
Heater:StopHeating
Heat: MoldProtect:
ActualUsedTm.:0.00Non-defectNo.:0pc
SystemNormal
I/ODiagnosis
ConditionSet
MoldManage
Debug
Clamp
Heater
Metering
Monitor
Product
Quality
Records
I/ODiagnosis
Detail
AutoStart
Mete.Detail
Statistics
Trend
Para.Exchange
MotorDiagnosis
Ejection
Waveform
StyleSet
AuthorityCode
9999999999
RemainTime
Not limited
UpdateLicense
Language
DefaultPage
Para.Check
Authority
中文
ScreenCal.
Monitor
DefaultSet
ON
System
③
SystemSet
StyleSet
MotorDiagnosis
I/ODiagnosis
Clamp
Heater
Metering
Monitor
Product
Quality
Records
I/ODiagnosis

4.5.4 System Setting



The **[SystemSet]** button shows and enter to this page by the button.



Working motor selection;

There are 5 motors can be selected: Mold-adjustment (**[MoldAdjust]**), mold-opening/clamping (**[MoldOpenClamp]**), ejection (**[Ejection]**), injection (**[Inj.]**) and metering(**[Mete.]**).

The ② and ③ display column are the system feedback and system control output; the size of the feedback parameter has its corresponding change based upon different motors.

The ④ is the parameter to be set when the corresponding motor is performed; the following table is reference value:

	Mold adjustment	Mold-opening/ clamping	Ejection	Injection	Metering
Linear acceleration/deceleration time (**[LinearAcc.Dec.Tm.]**)	Nothing		Nothing	Nothing	Nothing
S acceleration/deceleration time (**[SLineAcc.Dec.Tm.]**)					
Mold-opening acceleration/deceleration time (**[OpenAcc.Dec.Tm.]**)					
Mold-clamping deceleration time (**[CloseAcc.Dec.Tm.]**)					
High pressure mold-clamping acceleration time (**[HighPre.ClampAcc.Tm.]**)					

Mold-opening Destination position deceleration time ([**OpenObjectPos.Dec.Tm.**])		Mold-opening: Mold-clamping:			
Backpressure deceleration time			Nothing		Nothing

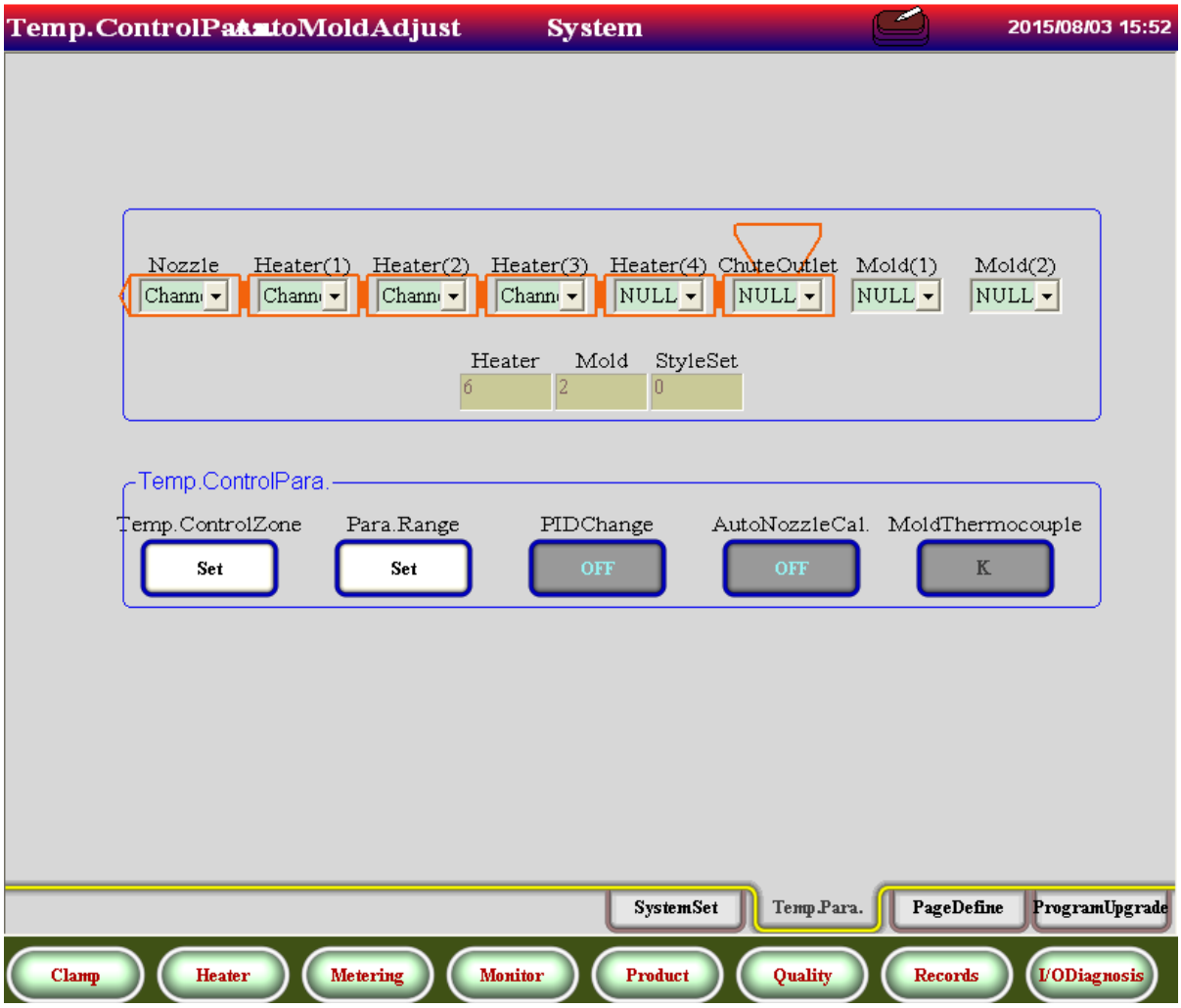
⑤ and ⑥ are the debugging-machine setting and debugging control or display section;

⑦ is the automatic grease-supply setting section;

⑧ is the button for changing the password by system;

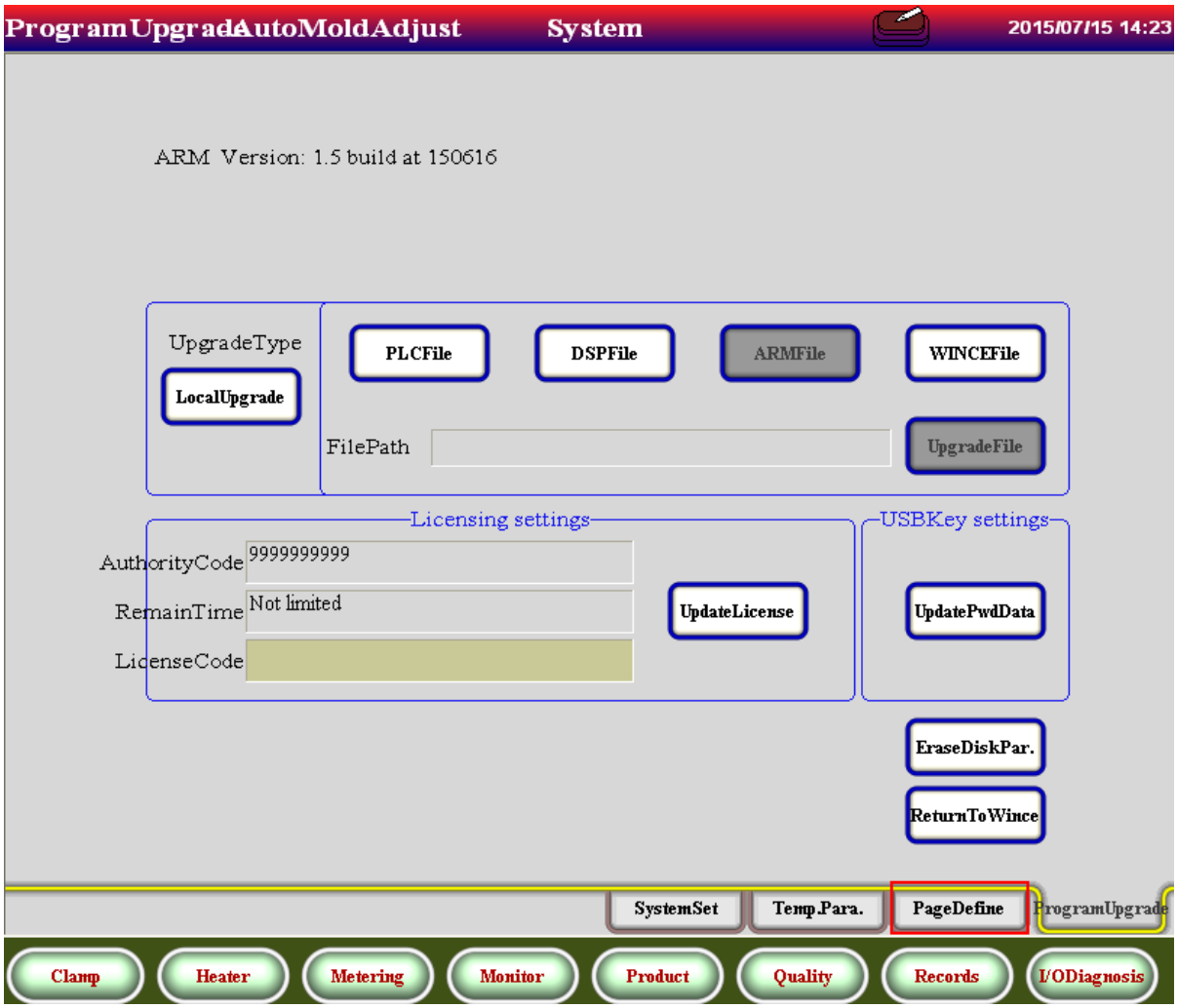
⑨ is the page shifting button.

4.5.5 Thermostat Parameter



Enter to the following page by clicking

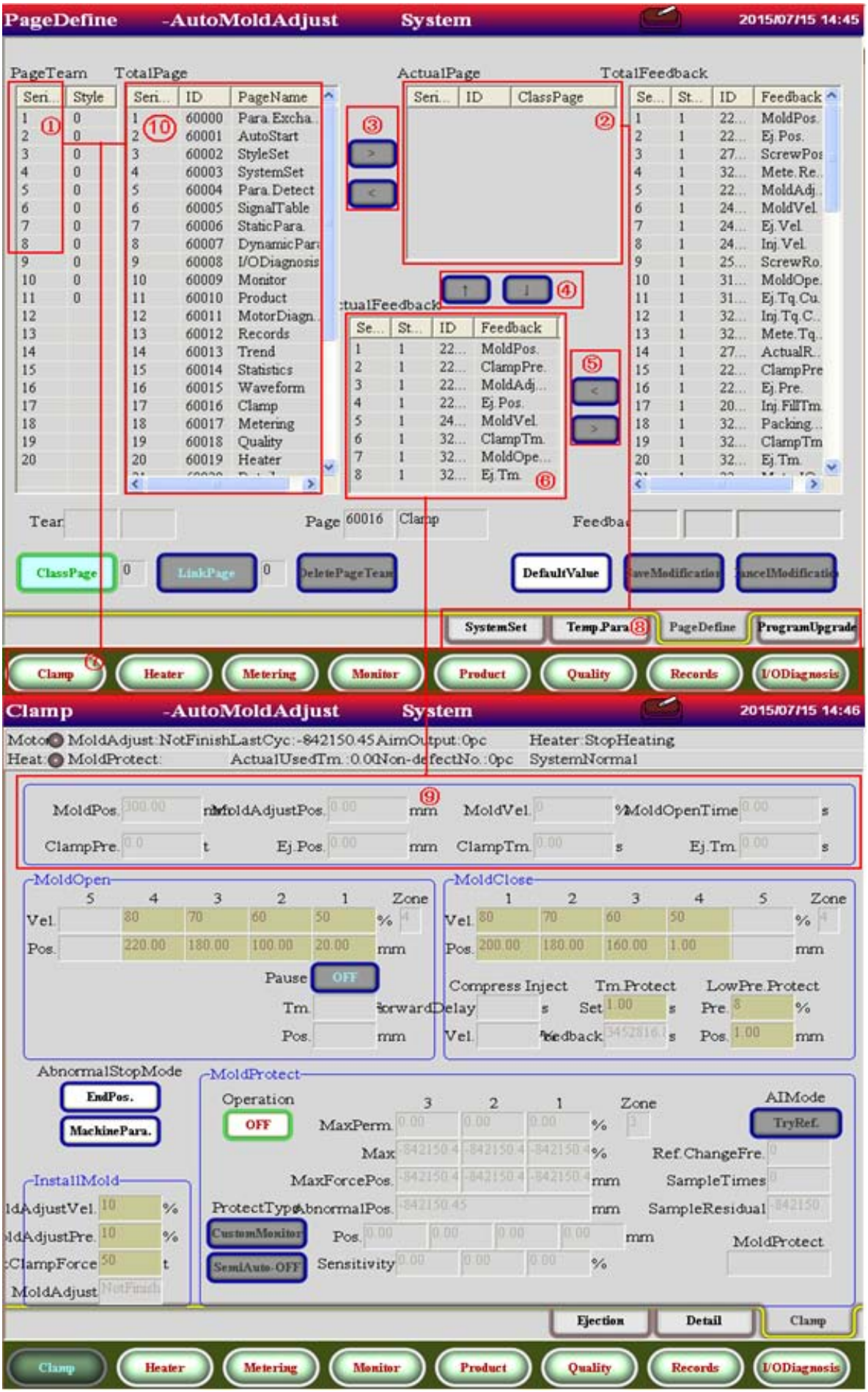
button:



Enter to the **[PageDefine]** page by clicking button.

4.5.6 Page Customization

4.5.6.1 Page Shifting Customization

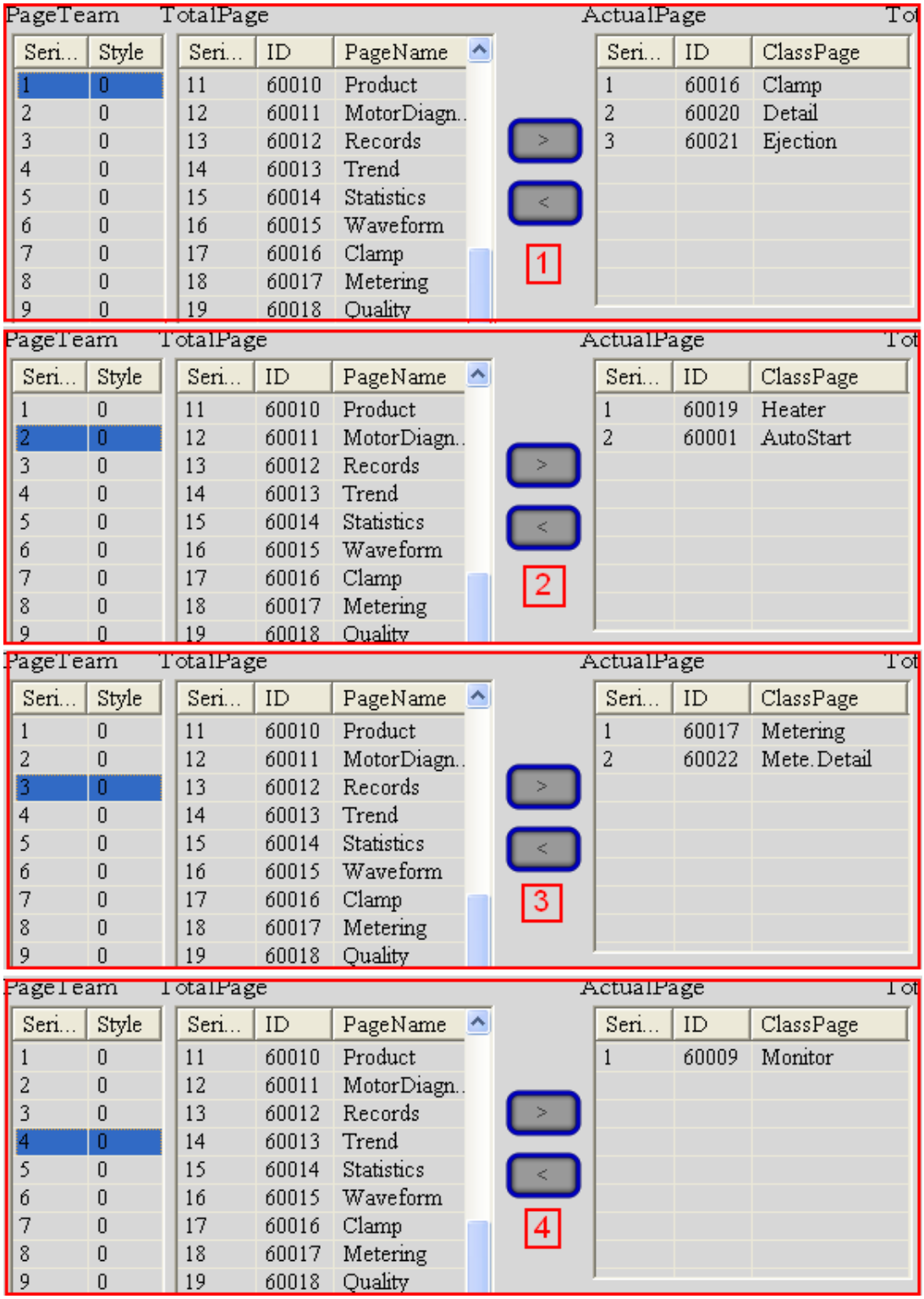

PageDefine -AutoMoldAdjust System 2015/07/15 14:45
PageTeam
TotalPage
ActualPage
TotalFeedback
ClassPage
LinkPage
DeletePageTeam
DefaultValue
SystemSet
Temp.Para
PageDefine
ProgramUpgrade
Clamp
Heater
Metering
Monitor
Product
Quality
Records
I/ODiagnosis
Clamp -AutoMoldAdjust System 2015/07/15 14:46
MoldOpen
MoldClose
AbnormalStopMode
EndPos.
MachinePara.
MoldProtect
InstallMold
Ejection
Detail
Clamp

This section explains the customization of the shifting page button, as the ⑧.

Refer to the above-mentioned figure:

The frames connected ① with ⑦ are corresponding, the series numbers of ⑦ frame button position from left to right are corresponding with the one of the ①.

The corresponding data may display on the frame ② by clicking the series numbers on the frame ① in the current setting; refer to the following figure.



And so forth!

The ② and ⑧ are corresponding; how many elements inside the frame ② means that how many elements will be displayed on the position of the frame ⑧.

Refer to the following figure:

1In the current setting, there are 3 elements ([Clamp], [Detail] and [Ejection]) in the series no.1.

The corresponding [Clamp] page has its corresponding shifting button.

2In the current setting, there are 2 elements ([Heater and [AutoStart]]) in the series no.2.

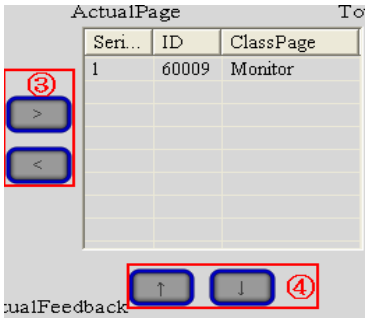
The corresponding [Heater] page has its corresponding shifting button.

3In the current setting, there are 2 elements ([Metering] and [Mete.Detail]) in the series no.3.

The corresponding [Metering] page has its corresponding shifting button.

4In the current setting, there is 1 element ([Monitor]) in the series no.4.

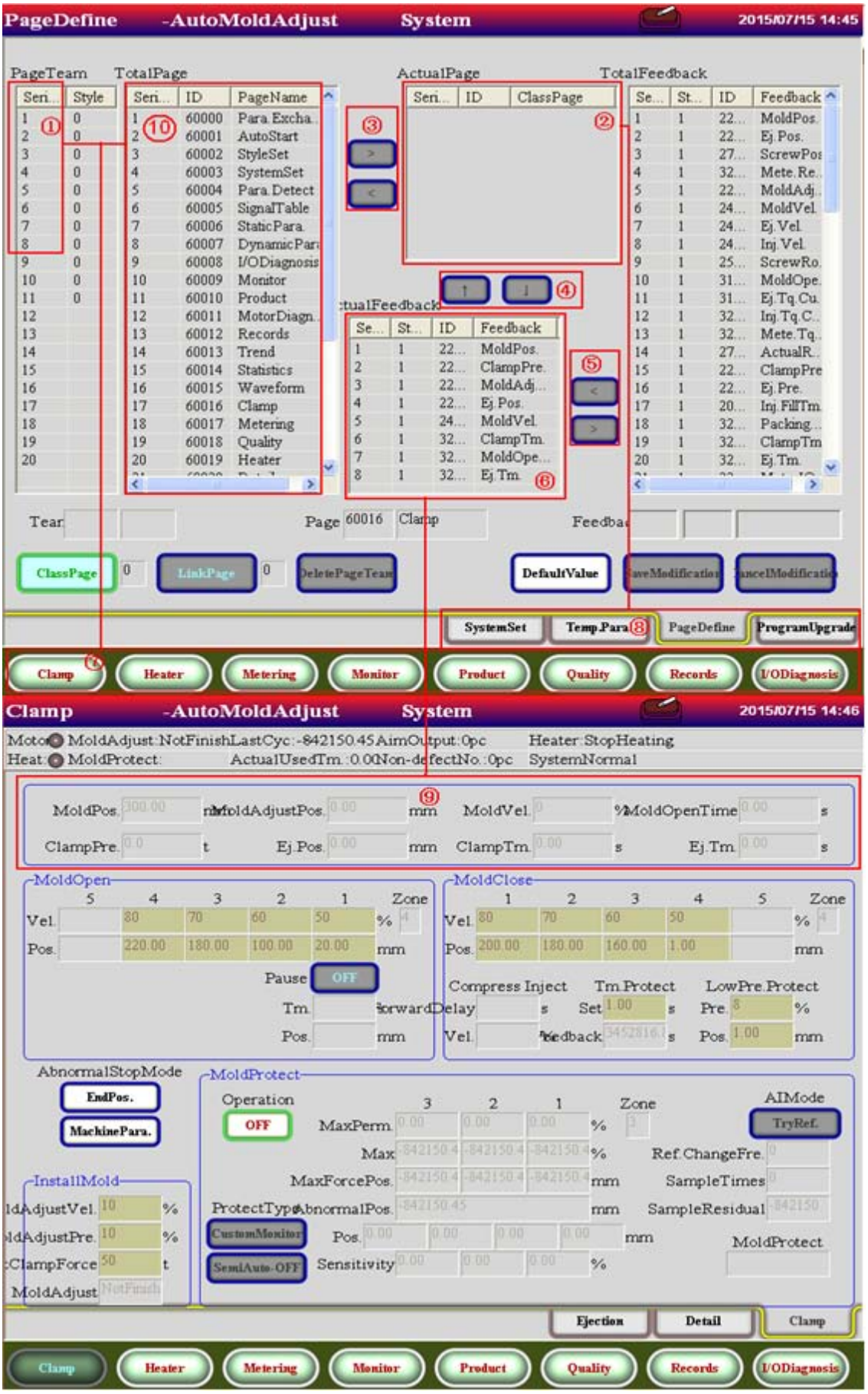
The corresponding [Monitor] page has its corresponding shifting button.



Click the element inside the frame②, the button ④ can be performed the sequencing operation to the element inside the frame ②.

The element addition operation can be performed inside the frame ⑩ by clicking the ③ button.

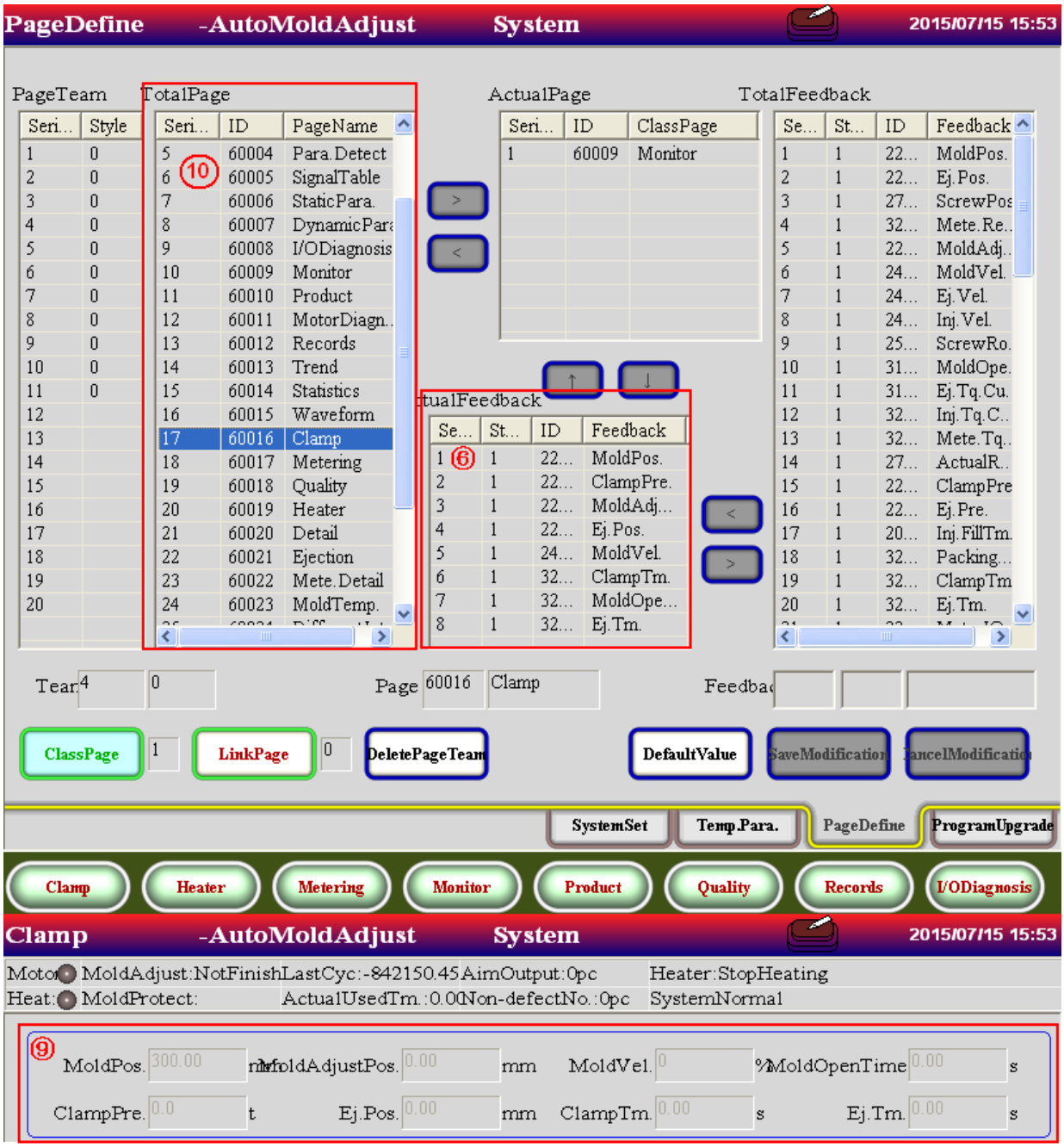
4.5.6.2 Page Feedback Customization



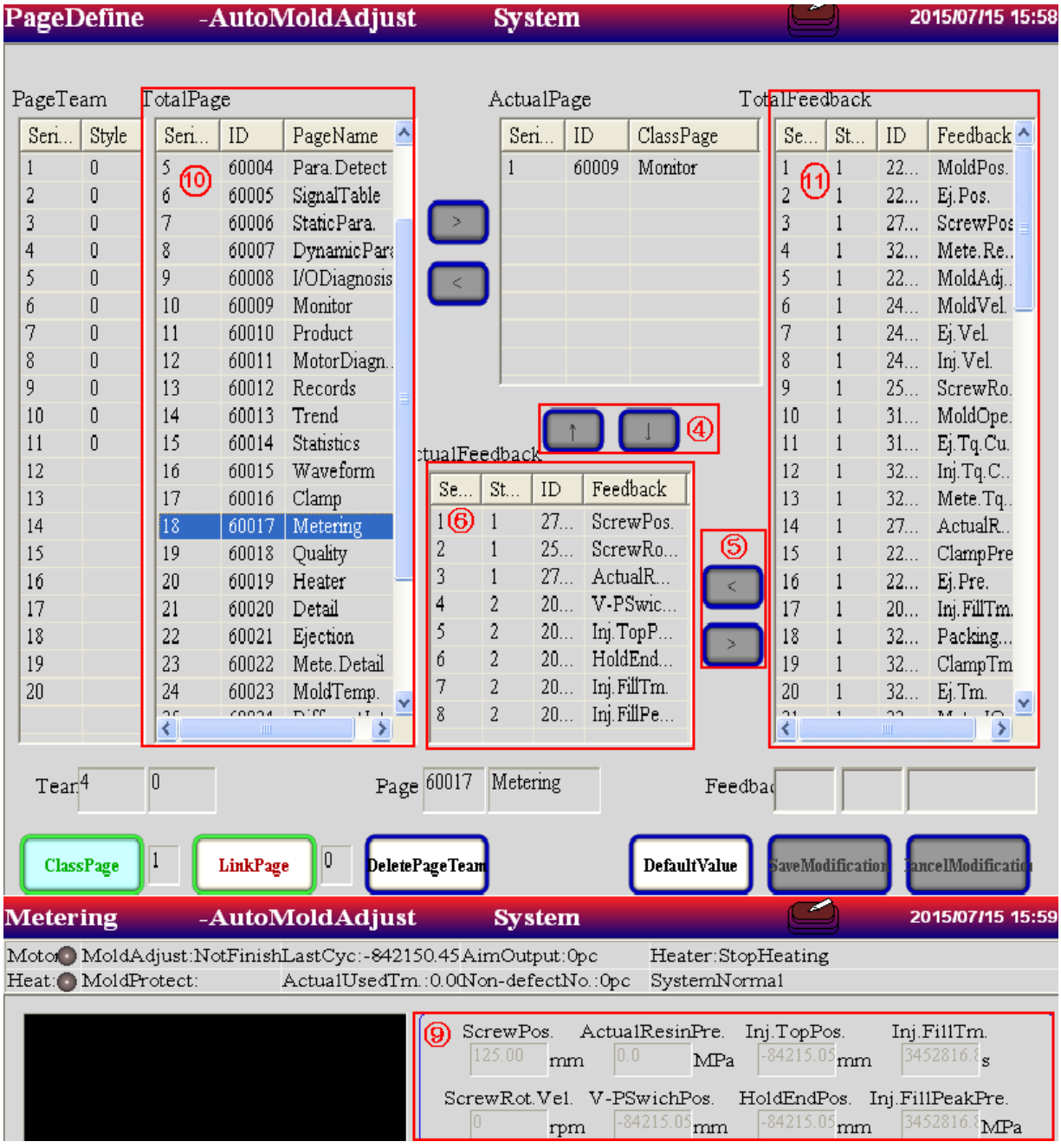
This section explains the feedback customization which shows at the ⑨; feedback column will show on the page of the [Clamp], [Heater] and [Metering], etc.

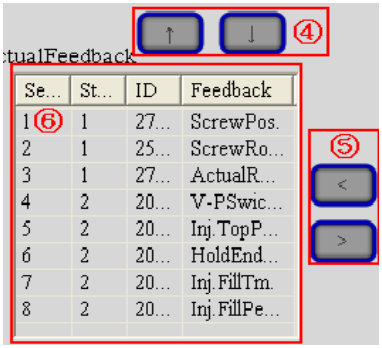
Frame ⑥ is corresponding with the feedback column on other pages;

For example, select the series no.17 ([Clamp]) inside the frame ⑩, in the current setting, ⑥ is corresponding to the feedback column of frame ⑨ on the [Clamp] page;



Select the series no.18 ([Metering]) inside the frame ⑩, in the current setting, ⑥ is corresponding to the feedback column of the [Metering] page, and so forth!





Click the element inside the frame ⑥, the button ④ can be performed the element sequencing operation inside the frame ⑥.

The element addition feedback operation can be performed inside the frame ⑪ by clicking ⑤ button.

4.6 Reason and Troubleshooting for Defective Product During Injection Molding

Glue absence	
The glue absence on the local may occur in the injection product when the mold cavity is not fully filled by the melting plastic.	
Reason	Troubleshooting
Lack of metering	Metering increase (SM)
	Delay the packing shifting position (VP shifting position)
	Improve the backpressure force
	Reduce the screw revolving velocity (VS, VSL)
	Reduce the temperature at the bottom of the charging barrel
Poor flow ability of the material	Raise the temperature of the cartridge heater
	Raise the temperature of the mold
	Improve the backpressure
	Improve the revolving speed of screw rod (Non-crystal VS, VSL)
	Decrease the revolving velocity of screw rod (Crystal VS, VSL)
	Enhance the injection velocity
	Enhance the injection pressure
	Enhance the packing pressure
Exhaust difficult inside the mold cavity	Decrease injection velocity
	Decrease the mold-clamping force
	Packing shifting position in advance (VP shifting position extended)
	Mold setting air-vent (vent)
	Change the gate position
	Fully dry the plastic
Lack of supply of the plastic	Check whether the screw rod zero is normal.
	Select the injection molding machine for the suitable injection value
	Check the fusion plastic reflux
Excessive flow resistance of mold	Extend the section area of the sprue, runner and gate

	Increase the wall-thinckness of the injection molding product
	Increase the point number of the gate
Shortage injection pressure of injection molding machine	Select the injection machine for suitable injection pressure
Imbalance of sprue gate glue-feeding	Adjust the gate balance distribution
Other reasons	Check whether the nozzle heater is damaged.
	Check the balance distribution of the mold temperature
	Check the cleaning of the nozzle, screw rod, charging barrel

Flash (overflow)	
Melting plastic is extruded from parting surface of the mold	
Reason	Troubleshooting
Lack of the mold-clamping force	Increase mold-clamping force
	Reduce injection pressure
	Reduce injection velocity
	Reduce packing pressure
Fine flow ability of material	Reduce packing pressure
	Reduce injection pressure
	Reduce injection velocity
	Reduce temperature of cartridge heater
	Reduce mold temperature
	Decrease the screw rod revolving velocity (Non-crystal VS, VSL)
	Increase the screw rod revolving velocity (Crystal VS, VSL)
	Packing shifting position in advance (VP shifting position extended)
Defective flow ability of material	Raise the temperature of cartridge heater
	Raise the temperature of the mold (runner flash)
	Enhance the backpressure
	Improve the screw rod revolving velocity (Non-crystal VS, VSL)
	Decrease the screw rod revolving velocity (Non-crystal VS, VSL)
	Improve the injection velocity (runner flash)
	Improve the injection pressure (runner flash)
	Improve the packing pressure (runner flash)

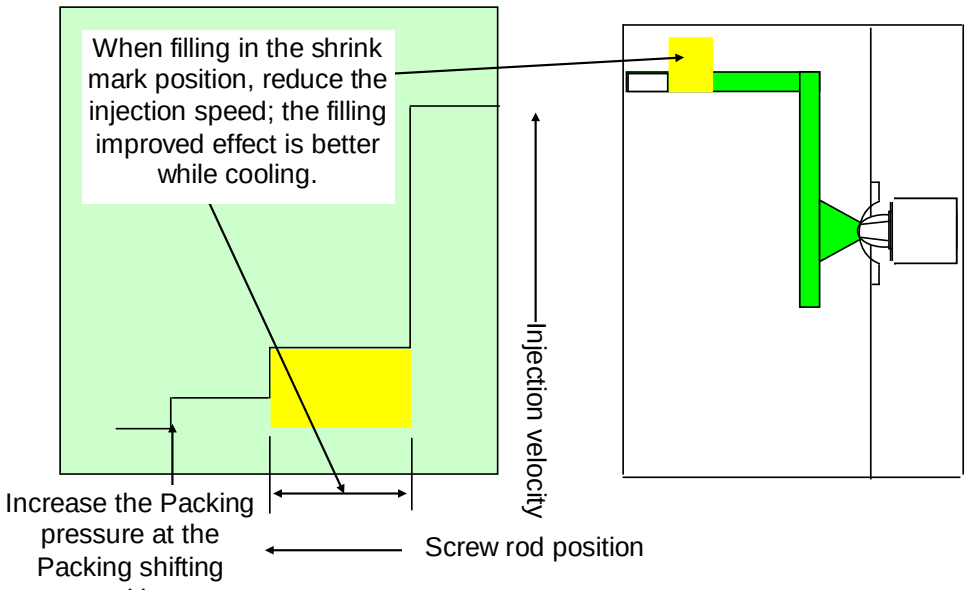
Excessive injection value	Packing shifting position in advance (VP shifting position extended)
	Reduce the metering (SM diminishing)
Defective mold contact surface (die joint)	Check whether the mold contact surface is scar or adheres foreign material
	Check the parallelization of the injection molding plate
	Check whether the foreign material on the surface of the mold installation
	Check the parallelization of the mold
Mold-clamping force shortage	Select the injection molding machine with appropriate mold-clamping force
Mold intensity shortage	Enhance the intensity of the mold
Imbalance distribution of gate	Adjust the distribution position of the gate

Bubble (Vacuum bubble)	
Bubble forms (empty) inside the injection molding product	
Reason	Troubleshooting
Lack of injection pressure and packing pressure causes excessive shrinkage	Improve the packing pressure
	Delay the packing time
	Packing shifting position in advance (VP shifting position extended)
	Improve the injection pressure
	Decrease the injection velocity
	Decrease the mold temperature
	Decrease the temperature of cartridge heater
	Extend the sectional area of the sprue, runner and gate
	Use the plastic with fine flow ability
	Select the injection molding machine for the appropriate injection pressure
Lack of feed-supply of plastic	Ensure the residual value (the most forward position is above 6mm)
	Improve the packing pressure
	Delay the packing time
	Improve the backpressure
	Improve the injection pressure
	Improve the injection velocity

	Raise the mold's temperature
	Raise the temperature of cartridge heater
Uneven cooling of the mold wall-thickness	Raise the mold's temperature
	Improve the injection velocity
	Lengthening cooling time
Air interfusion	Change the injection velocity method
	Reduce the plastic-pumping value of the screw rod
	Decrease the decompression velocity
	Decrease the revolving velocity of the screw rod (VS, VSL)
	Change the gate position
	Set the air-vent
	Fully dry the plastic
	Dry the machine with dehumidifier
Air generation	Reduce the temperature of cartridge heater
	Delay before lengthening metering
	Improve the backpressure (exhaust gases)
	Reduce the backpressure (When the dissolution occurs)
	Reduce the revolving velocity of the screw rod (VS, VSL)
	Avoid to use the pouring-oil or release-agent
	Select the injection molding machine with air-exhaust function
Excessive wall-thickness on local of the injection molding product	Thinning the thickness of the mold
	Thinning the thickness of the injection molding product

Bubble (Vacuum bubble)	
Bubble forms (empty) inside the injection molding product	
Reason	Troubleshooting
Others	Check whether the cable of the nozzle heater is cut off.
	Check the mold temperature is distributed evenly.
	Check the nozzle cleaning, screw cartridge heater

Shrink mark (Dent)	
Cavity or dent occur on the surface of the injection molding product	
Reason	Troubleshooting
Excessive shrink value due to the lack of the injection pressure and packing pressure	Improve the packing pressure
	Delay the packing time
	Packing shifting position in advance (VP shifting position extended)
	Improve the injection pressure
	Decrease injection velocity
	Decrease the mold's temperature
	Decrease the temperature of cartridge heater
	Extend the sectional area of the sprue, runner and gate
	Use the plastic with fine flow ability
	Select the injection molding machine with appropriate injection pressure
Lack of the plastic supply	Ensure the residual value (The most forward position is above the 6mm.)
	Improve the packing pressure
	Delay the packing time
	Improve the backpressure
	Improve the injection pressure
	Improve the injection velocity
	Improve the mold's temperature
	Improve the temperature of the cartridge heater
Excessive wall-thickness on the injection molding product local	Thinning the mold's thickness
	Thinning the thickness of the injection molding product
Others	Check whether the cable of the nozzle heater is cut off.
	Check the mold temperature is distributed evenly.
	Check the nozzle cleaning, screw cartridge heater



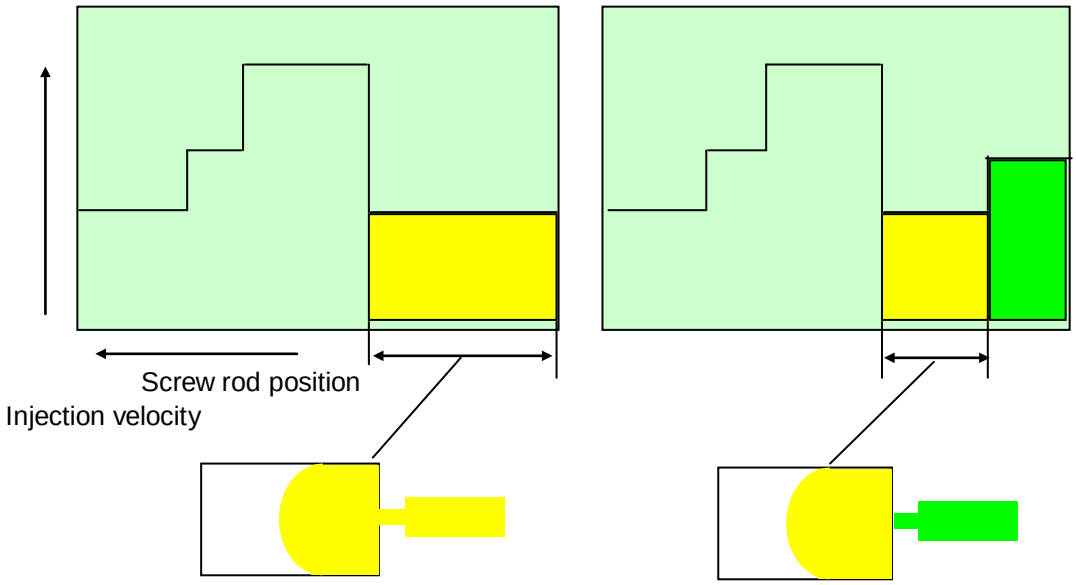
Warping (Distortion)	
The distortion occurs after the demolding of the injection molding machine is performed.	
Reason	Troubleshooting
Uneven pressure distribution (internal stress)	Decrease the packing pressure
	Shorten the packing time
	Packing shifting position in advance (VP shifting position extended)
	Improve the injection velocity (When the defective flow ability occurs)
	Decrease the injection velocity (When the fine flow ability occurs)
	Reduce the injection pressure
	Improve the mold's temperature
	Improve the temperature of the cartridge heater
	Improve the backpressure
	Improve the revolving velocity of screw rod (Non-crystal VS, VSL)
	Reduce the revolving velocity of screw rod (Crystal VS, VSL)
	Change the gate position
	Change the point numbers of gate
	Extend the diameter of gate
	Shorten the diameter of gate
	Use the plastic with fine flow ability
	Increase the wall-thickness of the injection molding

	product
取向变形 Orientation distortion	Decrease the injection velocity
	Raise the mold's temperature
	Raise the temperature of the cartridge heater

Warping (Distortion)	
The distortion occurs after the demolding of the injection molding machine is performed.	
Reason	Troubleshooting
Cooling distortion	Delay the cooling time
	Change the circuit method of cooling
	Change the mold material
	Diminishing the wall-thickness difference of the injection molding product
Defective demolding	Take the measures of the defective demolding

Flow mark	
The stripe occurs at the right corner along the flow direction on the injection molding product.	
Reason	Troubleshooting
Excessive slow of the injection velocity	Improve the injection velocity
	Delay the packing shifting position (VP shifting position extended)
	Improve the injection pressure
Defective air exhaust inside the cavity	Decrease the injection velocity
	Reduce the mold-clamping force
	Packing shifting position in advance (VP shifting position extended)
	Set the air exhaust
	Change the gate position
	Fully dry the plastic
Defective flow ability of the plastic	Improve the temperature of the cartridge heater
	Improve the mold's temperature
	Improve the backpressure
	Improve the revolving velocity of the screw rod (Non-crystal VS, VSL)
	Reduce the revolving velocity of screw rod (Crystal VS, VSL)
	Improve the injection velocity
	Improve the injection pressure

	Improve packing pressure
	Use the plastic with fine flow ability
	Increase the wall-thickness of the injection molding product
Fast when passing the gate	Decrease the injection pressure
	Decrease the mold's temperature
Quenching	Take the quenching measures
Excessive flow resistance of the mold	Extend the sectional area of the sprue, runner and gate
	Increase the wall-thickness of the injection molding product
	Increase the point number of the gate
Excessive wall-thickness on the local of the injection molding product	Thinning mold's thickness
	Thinning the thickness of the injection molding product



Control the position of the flow mark, slowly filling the injection (regardless of the forming at the low velocity) while cooling, after that, improve the injection velocity, so that the flow mark can be improved.

Quenching	
The low temperature plastic at the mouth of the nozzle flows into the cavity, the stripe shine change may be viewed at the surface of the injection molding product.	
Reason	Troubleshooting
Excessive low temperature at the mouth of the nozzle	Improve the nozzle temperature
	Movable injection carriage forming
Plastic flows to cavity	Decrease the backpressure
	Extend the retraction value of screw rod (SD)

	Movable injection carriage forming
	Decrease the nozzle temperature
Quenching material passes the quenching material well	Decrease the injection velocity
Reduce quenching	Improve the mold's temperature
	Improve the injection velocity
	Improve the backpressure
	Improve the temperature of cartridge heater
	Improve the revolving velocity of the screw rod (Non-crystal VS, VSL)
	Reduce the revolving velocity of the screw rod (Crystal VS, VSL)

Spiral (Gas mark)	
The stripe occurs from gate to the cavity after the plastic is solidified; the spiral occurs on the surface of the injection molding product.	
Reason	Troubleshooting
Fast passing the gate	Decrease the injection velocity
	Decrease the mold's temperature

Spiral (Gas mark)	
The stripe occurs from gate to the cavity after the plastic is solidified; the spiral occurs on the surface of the injection molding product.	
Reason	Troubleshooting
Quenching	Take quenching measures
Reduce the spiral	Improve the mold's temperature
	Improve the injection velocity
	Improve the backpressure
	Improve the temperature of cartridge heater
	Improve the revolving velocity of screw rod (Non-crystal VS, VSL)
	Reduce the revolving velocity of screw rod (Crystal VS, VSL)
	Adjust the injection speed to the super-high-velocity
Defective gate	Change the gate position
	Extend the gate sectional area
	Change the gate's type
Haze (Defective transparency)	

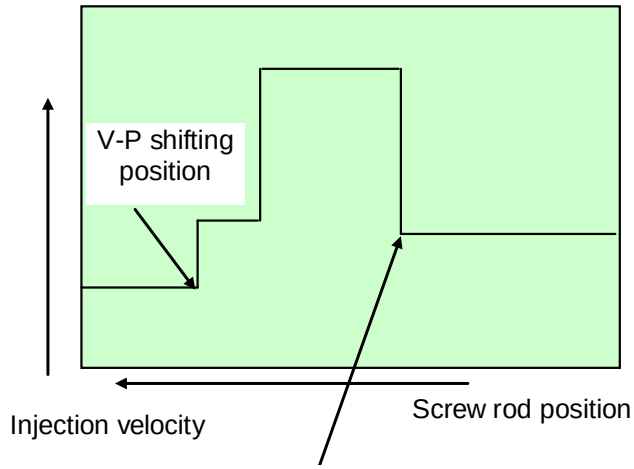
Different shine on the plastic surface and the plastic itself, it seems a layer of white film enclosure on its surface, which becomes mist floating.	
Reason	Troubleshooting
Lack of mold grind	Detect the mold's surface
Air interfusion	Change the gate position
	Set the air-vent
	Fully dry the plastic
Air generation	Avoid to excessively use the lubrication and release-agent
	Set the air-vent
	Use the injection molding machine of the air-exhaust function
	Fully dry the plastic
	Use the dehumidification method to dry the plastic
Complicated mold shape	Reduce the section-difference at the uneven surface
	Get an arc R at the edge
Defective gloss on the stripe surface	Packing shifting position in advance (VP shifting position extended)
	Reduce the packing force

Filamentary silk (crazing)	
The flow direction on the surface of the injection molding product	
Reason	Troubleshooting
Air generation	Reduce the temperature of the cartridge heater
	Lengthen the delay before metering
	Reduce the backpressure (with the dissolution)
	Improve the backpressure (In case of the defective air-vent)
	Reduce the revolving of the screw rod
Air generation	Avoid to excessively use the lubrication and release-agent
	Set the air-vent
	Use the injection molding machine of the air-exhaust function
	Fully dry the plastic
	Use the dehumidification method to dry the plastic
Air interfusion	Change the injection velocity method
	Reduce the plastic-pumping retraction value (SD

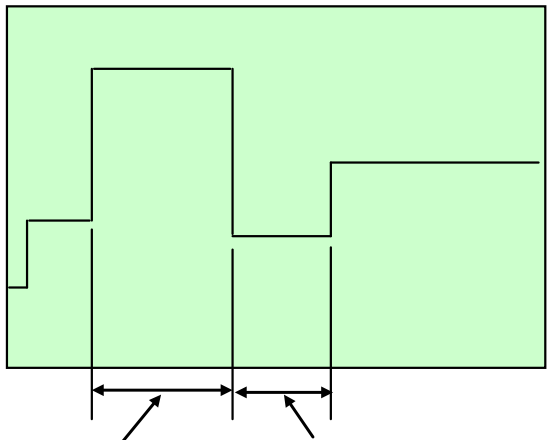
	diminishes)
	Reduce the decompression velocity (plastic-pumping velocity)
	Reduce the revolving velocity of the screw rod
	Change the gate position
	Set the air-vent port
	Fully dry the plastic
Overheating due to the cut at the nozzle and gate	Reduce the injection velocity
	Improve the cartridge heater temperature
	Improve the mold's temperature
	Reduce the packing force
	Extend the nozzle and section area of the gate
Moisture interfusion	Improve the temperature of the feed opening
Unmelted plastic interfusion	Improve the temperature of the cartridge heater
	Improve the mold's temperature
	Improve the backpressure
	Improve the revolving velocity of the screw rod (Non-crystal VS, VSL)
	Reduce the revolving velocity of the screw rod (Crystal VS, VSL)
Quenching	Use quenching
Different plastics interfused	Fully clean the plastic
	Seriously perform the plastic assortment administration
Dust on mold's molding surface	Inspect, cleaning the mold's forming surface
Plastic reservation dissolution	Use the cartridge heater of the screw rod with smaller size

Welding mark (Joint line)	
After the plastic does not absolutely melt when flows into the cavity to be shunted, and then confluents again, the mark occurs on the surface of the injection molding product.	
Reason	Troubleshooting
Poor flow ability of the plastic	Improve the temperature of the cartridge heater
	Improve the mold's temperature
	Improve the backpressure
	Improve the revolving velocity of the screw rod (Non-crystal VS, VSL)
	Decrease the revolving velocity of the screw rod

	(Crystal VS, VSL)
	Improve the injection velocity
Poor flow ability of the plastic	Improve the injection pressure
	Improve the packing pressure
	Use the plastic with fine flow ability
	Increase the wall-thickness of the injection molding product
Defective ejection of the air from the cavity	Decrease the injection velocity
	Reduce the mold-clamping force
	Packing shifting position in advance (VP shifting position extended)
	Set the air-vent
	Change the gate position
	Fully dry the plastic
Reduce the melting mark	Improve the packing force
	Lengthen the packing time
	Improve the mold's temperature
	Change the injection velocity
Inadequate gate position	Change the gate position
	Change the gate quantity



Controlling the position of the fusing mark occurs. Control the shifting position from the low velocity to the high one to change the position (Move the fusing mark to the inconspicuous position when there is no effect to intension.) of the fusing mark



The improvement method for the opposite controllable method and two defective phenomena at one time.

Cataclastic (Crack)

The crack or slightly gap may occur on the surface of the injection molding product.	
Reason	Troubleshooting
Uneven the pressure distribution (Inner stress)	Reduce the packing pressure
	Shorten the packing time
	Packing shifting position in advance (VP shifting position extended)
	Reduce the injection velocity
	Reduce the injection pressure
	Change the gate position
	Change the point numbers of the gate
	Reduce the gate diameter
	Extend the gate diameter
Poor flow ability of plastic	Improve the temperature of the cartridge temperature
	Improve the mold's temperature
	Improve the backpressure
	Improve the revolving velocity of the screw rod (Non-crystal VS, VSL)
	Reduce the revolving velocity of the screw rod (Crystal VS, VSL)
	Use the plastic with fine flow ability
	Increase the wall-thickness of the injection molding product
Defective demoulding	Use the troubleshooting of the defective demolding

Defective demoulding (Release agent)	
The injection molding product adheres to the mold when demolding; it may be hurt by ejector, or it may become white when ejecting.	
Reason	Troubleshooting
Cooling shortage	Delay the cooling time
Fast ejection velocity	Reduce the ejection velocity
Lack of the ejection amount	Extend the ejection travel
Lack of glue	Take measures of glue-shortage
Warped	Take the measures of warping
Lack of the demolding slope	Extend the demolding slope
	Eliminate the burr of the molding parting line (Undercutting)
Unsuitable position distribution of the ejector	Change the ejector position distribution

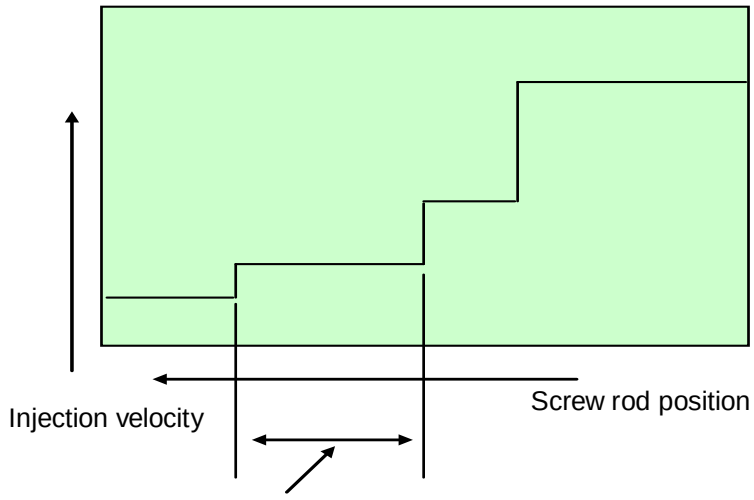
Inadequate structure of the ejector	Change the structure of the demolding plate
	Check the slope of the ejection plate and ejection direction
	Refuse the multi-point ejection
Defective nozzle contact surface	Check the nozzle contact surface
Interfuse the different plastics	Fully clean the plastic
	Seriously classify and manage the plastic
Unsuitable mold forming surface	Check whether the scar and rusty spot on the mold forming surface
	Fully grind the mold
Defective injection molding product strength	Increase the wall-thickness of the injection molding product
Injection molding product adheres to the mold	Use the demolding release-agent
	Set the air-vent
	Extend the gap between ejectors
	Use the blowing ejection

White (Whitening)	
The white occurs around the ejection sections after the injection molding product is demolded.	
Reason	Troubleshooting
Uneven pressure distribution (Inner stress)	Reduce the packing pressure
	Shorten the packing time
	Packing shifting position in advance (VP shifting position extended)
	Reduce the injection velocity
	Reduce the injection pressure
	Change the gate position
	Change the point numbers of the gate
	Reduce the gate diameter
	Extend the gate diameter
Poor flow ability of the plastic	Improve the temperature of the cartridge heater
	Improve the mold's temperature
	Improve the backpressure
	Improve the revolving velocity of the screw rod (Non-crystal VS, VSL)
	Reduce the revolving velocity of the screw rod (Crystal

	VS, VSL)
	Use the plastic with fine flow ability
	Increase the wall-thickness of the injection molding product
Defective demolding	Use the measures for defective demolding

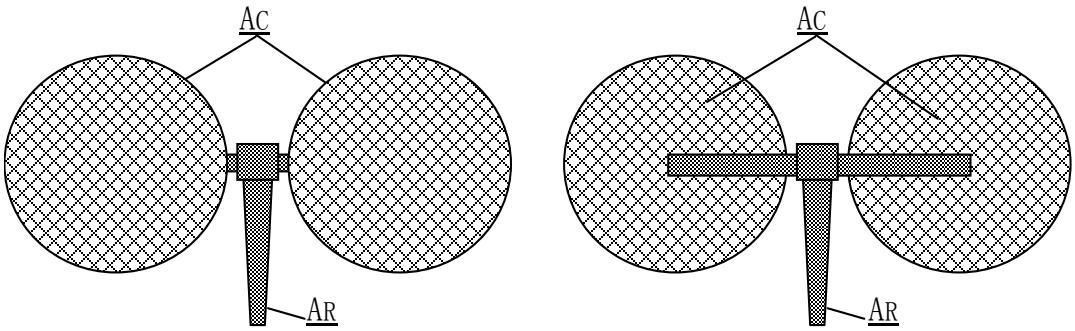
Burnt (Black line)	
Overheating occurs by cutting and the air is compressed inside the cavity, so that the plastic is burnt and discolored by high temperature.	
Reason	Troubleshooting
Overheating occurs by cutting at the nozzle and the gate position.	Reduce the injection velocity
	Improve the temperature of the cartridge heater
	Improve the mold's temperature
Overheating occurs by cutting at the nozzle and the gate position.	Reduce the packing pressure
	Extend the nozzle and the sectional area of the gate
Defective air-vent inside the cavity	Reduce the injection velocity
	Reduce the mold-clamping force
	Packing shifting position in advance (VP shifting position extended)
	Set the air-vent port
	Change the gate position
	Fully dry the plastic
Thermal decomposition of the plastic	Reduce the temperature of the cartridge heater
Burnt (Black line)	
Overheating occurs by cutting and the air is compressed inside the cavity, so that the plastic is burnt and discolored by high temperature.	
Reason	Troubleshooting
Thermal decomposition of the plastic	Prolong the delay time before metering
	Reduce the revolving velocity of the screw rod
	Reduce the backpressure
Elements from the empty rotation of the screw rod	Improve the backpressure
	Improve the revolving velocity of the screw rod (Non-crystal VS, VSL)
	Decrease the revolving velocity of the screw rod (Crystal VS, VSL)
Cold-material	Take the measures for cold-material
Overheating for cutting during the	Check whether the actual temperature of the

collosol	cartridge heater is higher the set one.
	Reduce the temperature of the cartridge heater
	Change other plastics
Plastic dissolution due to the long time lag	Use the screw rod cartridge heater with smaller size
Interfuse to different plastics	Fully clean the plastic
	Seriously classify and manage the plastic
Others	Check whether the nozzle heater is disconnected.
	Check the mold temperature is evenly distributed.
	Inspection, nozzle cleaning, screw rod cartridge heater



Reduce the injection velocity, improve the burnt by the injection after the air and gas are discharged.

4.7 Calculation Method of Mold-Clamping Force



$$F_{CR}=\frac{(P_m\times A_C)+(2P_m\times A_R)}{1000}\cdots\cdots(A)$$

$$F_C=\frac{P_m\times A_C}{1000}\cdots\cdots(B)$$

$$F_R=\frac{2P_m\times A_R}{1000}\cdots\cdots(C)$$

The mold-clamping force can be calculated by the following formulas:

FCR: The necessary mold-clamping force (T) of the 2-plate mold

FC: The necessary mold-clamping force (T) of the product cavity of the 3-plate mold

FR: The necessary mold-clamping force (T) of the runner cavity of the 3-plate mold

AC: The overall projective area (cm²) along the mold-opening of mold's product cavity

AR: The overall projective area (cm²) along the mold-opening of mold's runner cavity

Pm: The average plastic pressure (kgf/ cm²) inside the cavity

Plastic	**Pm（kgf/ cm²）**
AS, PS	245～392
PA, PP, PE, ABS	294～490
POM, PMMA, PC+ABS	343～580
PC, PBT, PET, PPS	392～784

Notice:

The mold-clamping force can be determined by the above-mentioned (A), (B) and (C) formulas, which only can be regarded as the initial condition; the mold-clamping force should be modified based upon the status of the plastic product.

The flash will not generate due to the shortage of the mold-clamping force, as well, it may affect the dimension and weight of thickness direction for the plastic product, and therefore, when the mold-clamping force is calculated, it is better to confirm the dimension and weight of thickness direction for the plastic product while modifying the mold-clamping force.

In order to calculate conveniently, the average plastic pressure of the runner is temporarily regarded as 2 times to calculation according to the above-mentioned (A), (B) and (C) formulas.

The plastic with glass fibre can be calculated with that Pm adds 100 kgf/cm²～200 kgf/cm².